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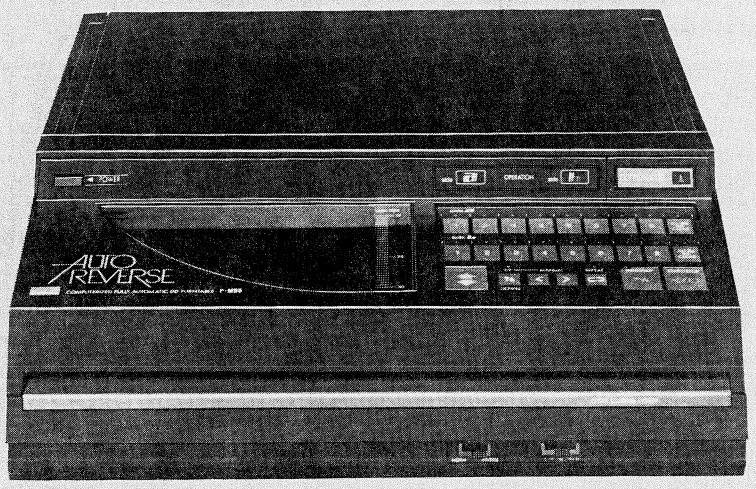
SERVICE MANUAL

COMPUTERIZED FULLY AUTOMATIC DD TURNTABLE

SANSUI P-M90

(Silver & Black Model)



CAUTION

1. Parts identified by the ⚠ symbol on the schematic diagram and the parts list are critical for safety. Use only replacement parts that have critical characteristics recommended by the manufacturer.
2. Make leakage-current or resistance measurements to determine that exposed parts are acceptably insulated from the supply circuit before returning the appliance to the customer.

Sansui

SANSUI ELECTRIC CO., LTD.

•SPECIFICATIONS

Type	Direct-drive turntable
Rated speeds	33-1/3, 45 rpm
Platter	76 mm (3") diameter, 0.37 kg weight
Motor	Coreless and Brushless DC/FG Servo
Wow/flutter	0.08% (WRMS)
Signal-to-noise ratio	Better than 72 dB (DIN-B) Better than 60 dB (IEC-B)
Effective tonearm length	70 mm (2-3/4")

Cartridge

Type	Dual Magnet type
Output voltage	2.5 mV (1,000 Hz, 35.4 mm/sec)
Correct load impedance	47 kohms
Frequency response	10 ~ 20,000 Hz
Stylus	0.6 mil diamond stylus (SN-909 replacement stylus)

Others

Power voltage	110 ~ 120/220 ~ 240V (50/60 Hz)
For U.S.A. and Canada	120V (60 Hz)
Power consumption	25W
Dimensions	350 mm (13-13/16") W 120 mm (4-3/4") H 355 mm (14") D
Weight	7.2 kg (15.9 lbs.) net 8.6 kg (19.0 lbs.) packed

* Design and specifications subject to change without notice for improvements.
* In order to simplify the explanation illustrations may sometimes differ from the originals.

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CAUTION

1. The symbols, UL, CSA, SA, BS, UK, EU, AS and XX on the parts list and the schematic diagram mean followings respectively.

   UL..... Manufactured for U.S.A market.
   (Underwriters Laboratories approved model.)
   CSA..... Manufactured for Canadian market.
   SA..... Manufactured for South African market.
   BS, UK ..... Manufactured for United Kingdom market.
   EU ..... Manufactured for European market.
   AS..... Manufactured for Australian market.
   XX..... Standard Version.
   NON MARK ..... Common Parts.

2. Some printed circuit boards are not supplied as the assembled. To separate these in this service manual, the stock No's are not indicated at the ends of the board names. However, the individual parts on the circuit boards are provided by orders.

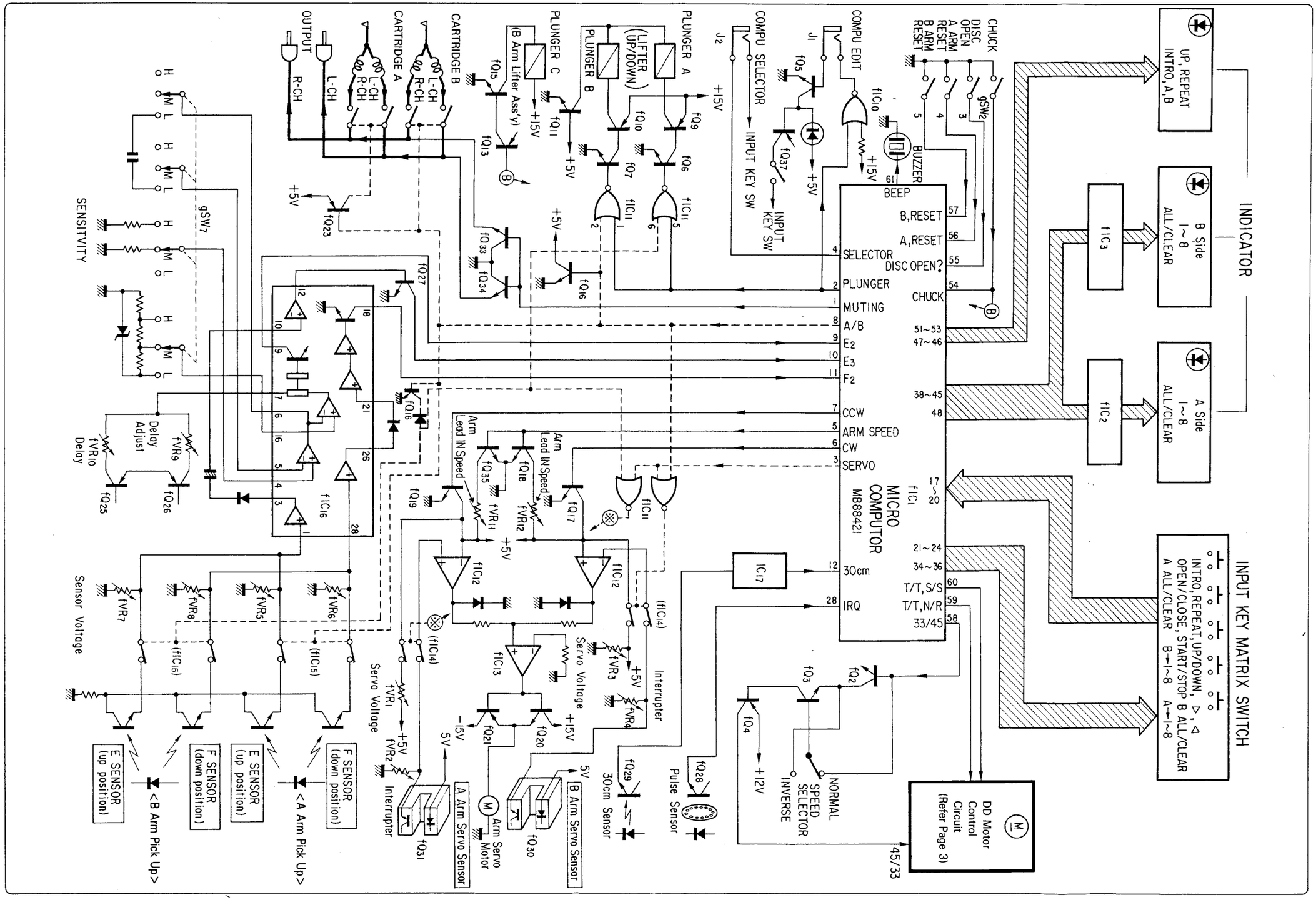
3. Since some of capacitors and resistors are omitted from parts lists in this service manual, refer to the Common Parts List for capacitors & resistors, which was issued on February 1983.

4. Abbreviations in this service manual are as follows.

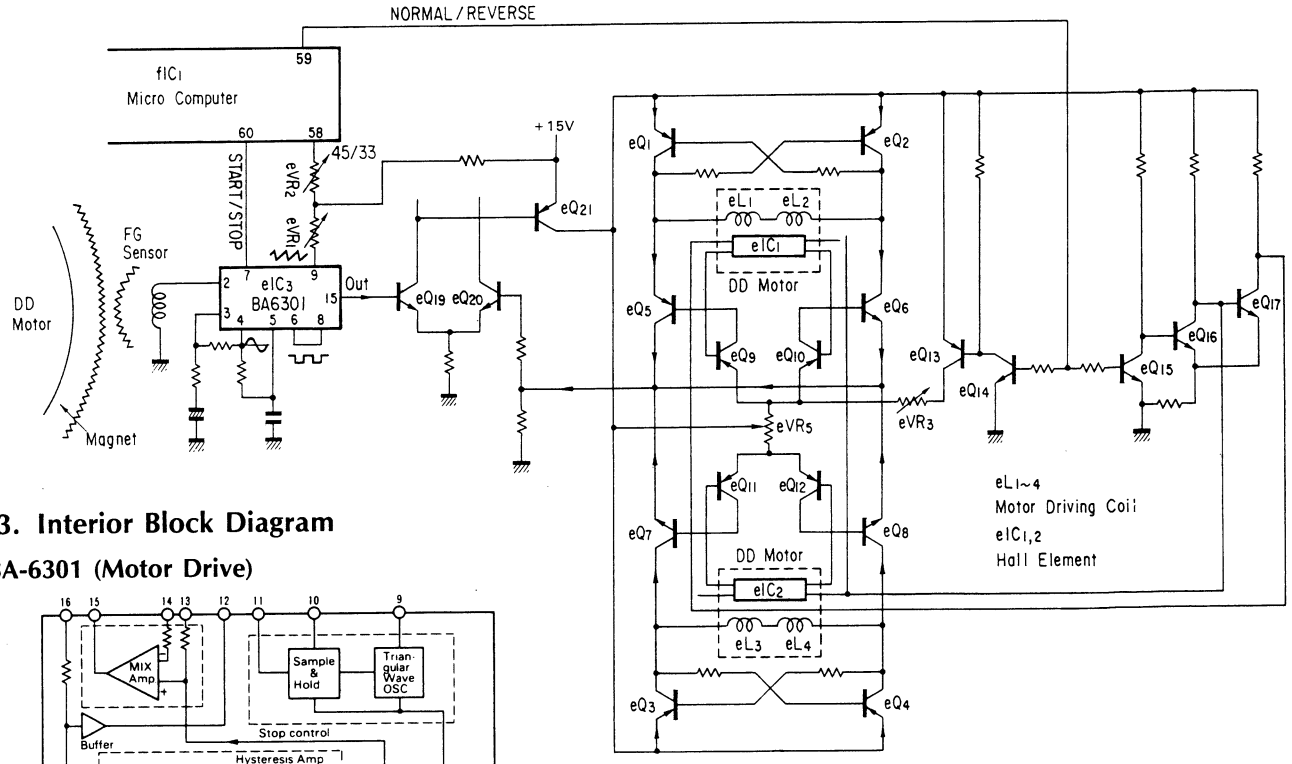
•Abbreviations List

C.R.	: Carbon Resistor	E.B.L.	: Low Leak Bi-Polar Electrolytic Capacitor
S.R.	: Solid Resistor	Ta.C.	: Tantalum Capacitor
Ce.R.	: Cement Resistor	F.C.	: Film Capacitor
M.R.	: Metal Film Resistor	M.P.	: Metalized Paper Capacitor
F.R.	: Fusing Resistor	P.C.	: Polystyrene Capacitor
N.I.R.	: Non-Inflammable Resistor	G.C.	: Gimmic Capacitor
A.R.	: Array Resistor	A.C.	: Array Capacitor
C.C.	: Ceramic Capacitor	V.R.	: Variable Resistor
C.T.	: Ceramic Capacitor, Temoerature Compensation	S.V.R.	: Semi Variable Resistor
E.C.	: Electrolytic Capacitor	SW.	: Switch
E.L.	: Low Leak Electrolytic Capacitor	Chip R.	: Chip Resistor
E.B.	: Bi-Polar Electrolytic Capacitor	Chip C.	: Chip Capacitor

1. BLOCK DIAGRAM 1-1. Arm Control Circuit

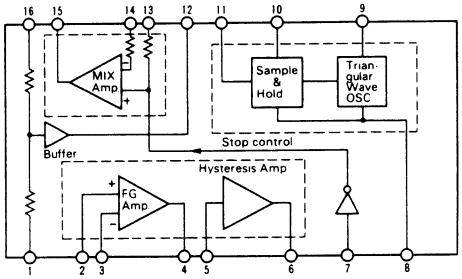


1-2. Motor Control Circuit <S-0206>

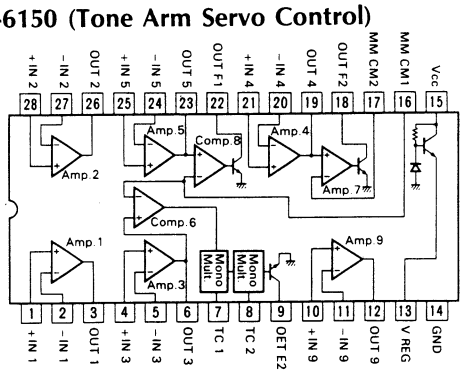


1-3. Interior Block Diagram

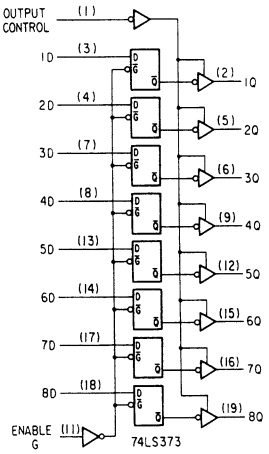
•BA-6301 (Motor Drive)



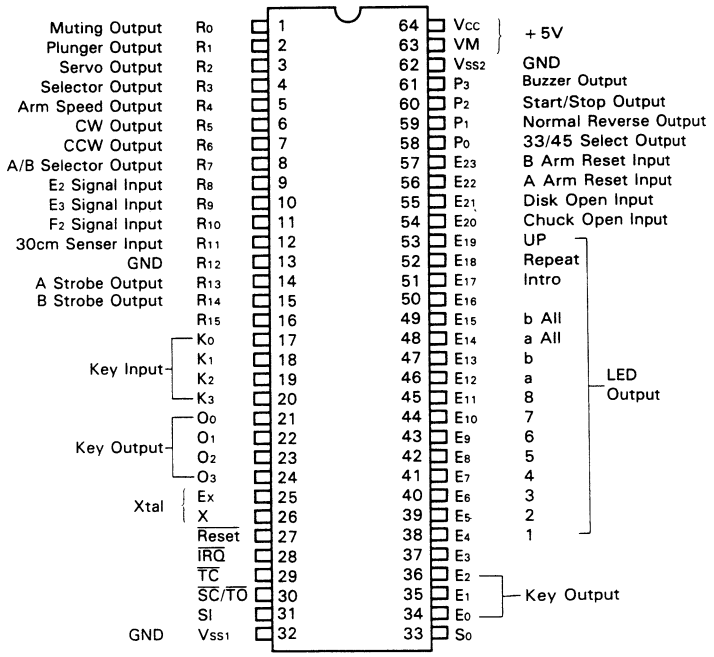
•BA-6150 (Tone Arm Servo Control)



•74LS373 (Octal 3state D-latch)



•MB88421 (Micro computer)



2. MAIN CIRCUIT FUNCTIONS

1. Pulse sensor

In the microcomputer, various motor speeds are stored, which are suitable for the reset positions and the lead-out positions of 30cm, 25cm and 17cm size record disk. The arm is moved down in combination of signals detected by the 30cm disk sensor, 25cm and 17cm disk detection signals (E_3) detected by the E sensor, and signals detected by the pulse sensors corresponding to disk sizes.

2. 30cm disk selecting sensor

The position of the arm on the arm rest is located near the lead-in position of a 30cm disk. Therefore, a separate sensor is arranged to securely select a 30cm disk, without use of the signal (E_3) detected by the E sensor.

3. E, F sensor

The signals detected by the E, F sensor are divided into three signals E_2, E_3, and F_2 through appropriate circuits.

- **E_2 signal** ..... indicates the number of counted musics, which is necessary to move down the tone arm onto the start of a desired music during the automatic music selection operation.
- **E_3 signal** ..... indicates the presence or absence of a 25cm or 17cm size disk.
- **F_2 signal** ..... indicates the detection of a music intermission during automatic music selection operation (tracing operation) and detection of the end of the last music. The arm is lifted up in combination of this F_2 signal and the pulse sensor signals.

4. Delay circuit

Since the E sensor is located about 3mm ahead of the stylus tip, it is necessary to delay the signal detected by the E sensor electrically. By adjusting this circuit, it is possible to eliminate the signal detection error caused by mismatching of the mechanism operation.

5. Music selection sensitivity switching circuit

The signals E_2, F_2 are converted into three different stages in order to perform an accurate automatic music selection operation.

6. CHUCK switch (gSW_2)

This switch detects that a record disk is perfectly mounted.

7. DISK OPEN switch (gSW_3)

This switch detects that the disk plate is pulled out perfectly.

8. A, B ARM RESET switches (gSW_4, gSW_5)

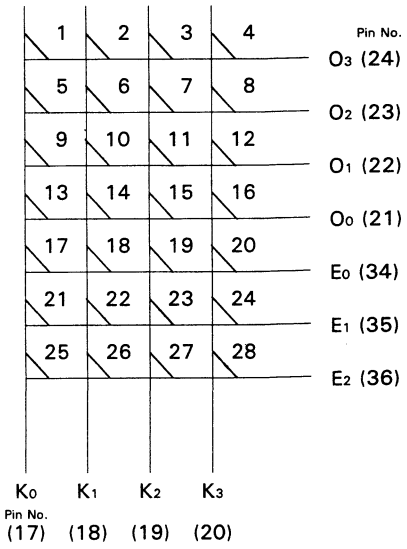
These switches detect that the A, B arms are reset, respectively.

9. Muting operation timing

- During the automatic disk selection operation and the manual operation, the muting is off when the lifter is down but on when the lifter is up.
- When the stylus goes down onto a music intermission interval during the automatic music selection operation, the muting is off 1.7 secs after the stylus begins to go down. Further, when the stylus goes down onto a modulated groove near the end of the preceding music, the muting is off the instant the succeeding music intermission is detected.

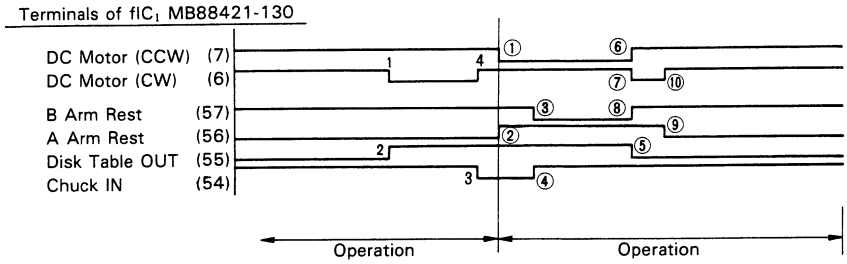
•Input Key Matrix of Microcomputor IC MB88421

NO.	Key Name	Key Matrix	NO.	Key Name	Key Matrix	NO.	Key Name	Key Matrix
1	A NO.1	K_0 O_3	11	B NO.3	K_2 O_1	21	EJECT	K_0 E_1
2	A NO.2	K_1 O_3	12	B NO.4	K_3 O_1	22	◁	K_1 E_1
3	A NO.3	K_2 O_3	13	B NO.5	K_0 O_0	23	▷	K_2 E_1
4	A NO.4	K_3 O_3	14	B NO.6	K_1 O_0	24	PAUSE	K_3 E_1
5	A NO.5	K_0 O_2	15	B NO.7	K_2 O_0	25	INTRO	K_0 E_2
6	A NO.6	K_1 O_2	16	B NO.8	K_3 O_0	26	REPEAT	K_1 E_2
7	A NO.7	K_2 O_2	17	A ALL CLEAR	K_0 E_0	27		
8	A NO.8	K_3 O_2	18	B ALL CLEAR	K_1 E_0	28		
9	B NO.1	K_0 O_1	19	S/S	K_2 E_0	29		
10	B NO.2	K_1 O_1	20			30		



3. MAIN OPERATION TIMING CHART

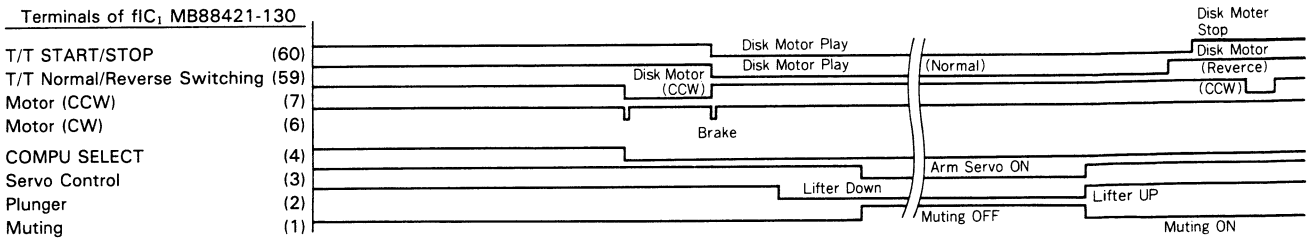
3-1. Loading Timing



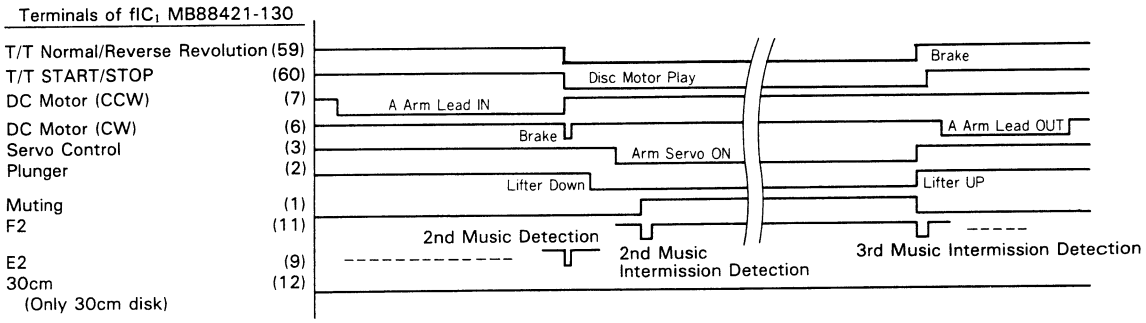
CLOSE Operation
1. Servo Motor start(CW)
2. Disk Open SW gSW3 OFF
3. Chuck SW gSW2 ON
4. Servo Motor stop(CW)

OPEN Operation
① Servo Motor start(CCW)
② A Arm Reset SW gSW4 OFF
③ B Arm Reset SW gSW5 ON
④ CHUCK SW gSW2 OFF
⑤ Disk Open SW gSW3 ON
⑥ Servo Motor stop(CCW)
⑦ Servo Motor start(CW)
⑧ B Arm Reset SW gSW5 OFF
⑨ A Arm Reset SW gSW4 ON
⑩ Servo Motor stop(CW)

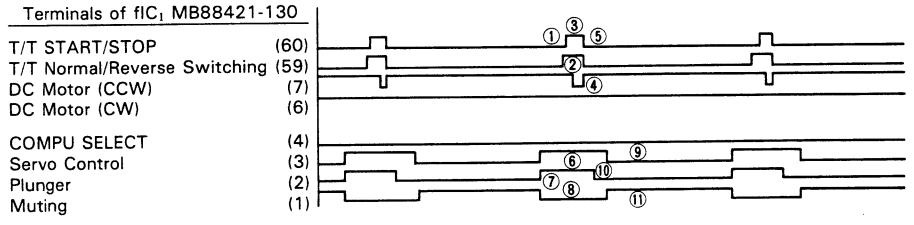
3-2. 30cm Disk Selection Lead-in, End Timing



3-3. 2nd Music Selection Timing on 30cm Disk of A Side



3-4. ALL INTRO SKIP Timing



① Disk Motor Play
② Disk Motor Play(Reverce)
③ Disk Motor Stop
④ Servo Motor ON(CCW)
⑤ Disk Motor Play
⑥ Arm Servo OFF
⑦ Lifter UP
⑧ Muting ON
⑨ Arm Servo ON
⑩ Lifter Down
⑪ Muting OFF

4. ADJUSTMENT

A. Preparation

1. Remove the top plate (No.1 in Part list excluding circuit boards). See "How to replace the main parts" on page 16.
2. Remove only the key board from the front panel, and then connect three connectors extending from the key board to the S-0208 computer board.
3. Since the TP pins of S-0209 board may disappear under the motor frame when the arm moves, connect some wires to the TP pins necessary for adjustment. (See Fig. 4-1)
4. Turn on the interlock switch in accordance with the following procedure:
   1) Remove two small screws for mounting the interlock switch.
   2) Roll up an appropriately sized paper as shown, insert the rolled paper into the contact portion of the microswitches, and then fixed it by an adhesive tape.

B. Caution

1. The A-arm and B-arm are mechanically linked with each other. Further, the reset position of A-arm corresponds to the lead-out position of B-arm.
   Therefore, it is possible to know the B-arm position on the basis of the A-arm position. However, positively depress each key ALL a, ALL b, [<], and [>].
2. The adjusting control knob (variable resistor) of S-0209 may disappear under the motor frame as the arm moves.
   Therefore, adjust it through an adjusting aperture formed in S-0208. (See Fig. 4-3)
3. In case the operation keys are inoperative, turn off the main power switch and then turn on it again before depressing the operation keys.
4. Perform the adjustment in accordance with the determined procedure.

Fig. 4-1

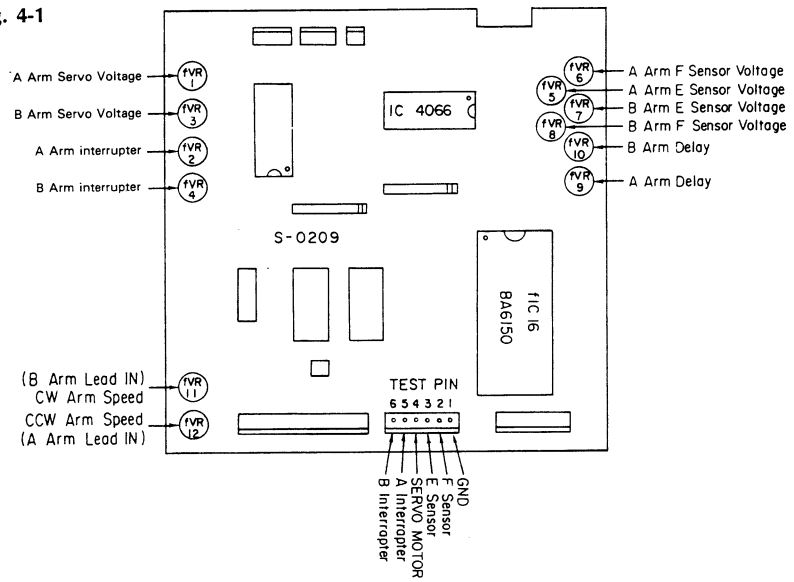


Fig. 4-2

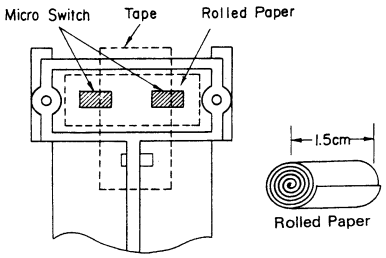
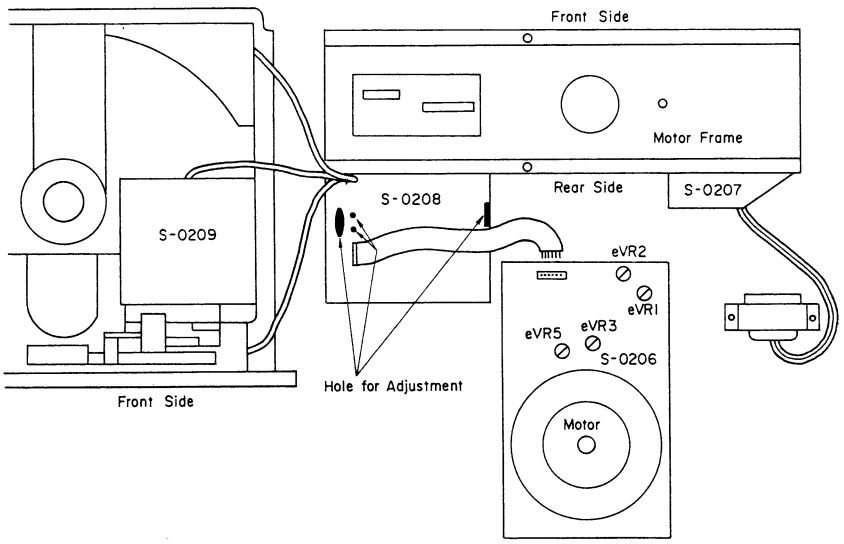
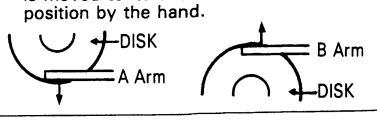
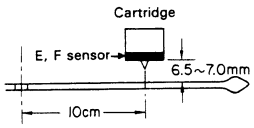
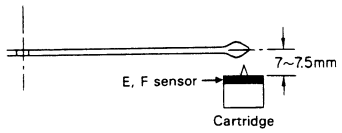


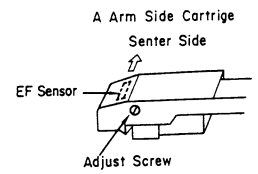
Fig. 4-3

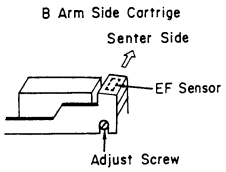


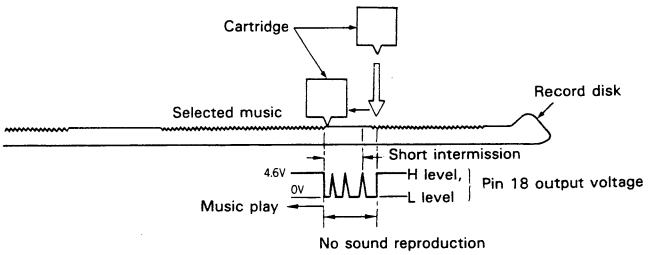
•Adjustment List (See Figs. 4-1 and 4-3 for points to be checked and adjusted)

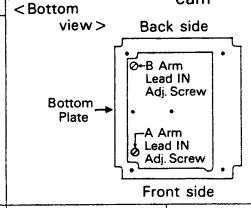
	Adjustment Procedure	Checked Position	Adjusted Parts	Adjustment Contents	Adjusting Conditions
1	A-arm interrupter voltage adjustment	Between S-0209 TP5 and GND (fQ31 emitter) DC voltmeter	fVR2	2~2.5V	1. Without any record disk. 2. Stop DD motor. 3. Bring A-arm near lead-out position (B-arm read-in position) by the hand. 4. Adjust the voltage when A- or B-arm is moved to its extreme outside position by the hand. 
2	B-arm interrupter voltage adjustment	Between S-0209 TP6 and GND DC voltmeter	fVR4	2~2.5V	
3	A-arm servo voltage adjustment	Between S-0209 TP4 and GND (on the positive side of arm servomotor) DC voltmeter	fVR1	−1V (It is preferable that the arm moves about 0.5mm toward the inside when lifter is down.)	1. Set a 30cm disk. 2. Stop DD motor. 3. Bring A-arm near lead-out position or B-arm near lead-in position by the hand. 4. Set lifter down by the hand.
4	B-arm servo voltage adjustment	Between S-0209 TP4 and GND (on the positive side of arm servomotor) DC voltmeter	fVR3	+1V (It is preferable that the arm moves about 0.5mm toward the inside when lifter is down.)	
5	A-arm speed adjustment	Time interval from when A-arm starts to when it stops. (A time device measurable up to seconds).	fVR11	4 secs. (The speed increases when fVR11 is rotated clockwise.)	1. Set a 30cm disk. 2. Stop DD motor. 3. Move A- or B-arm by use of ⊠, ⊠ key. 4. Check that A-arm moves from lead-out position to reset position with ALL a key kept depressed.
6	B-arm speed adjustment	Time interval from when B-arm starts to when it stops. (A time device measurable up to seconds).	fVR12	4 secs. (The speed increases when fVR12 is rotated clockwise.)	
7	A-arm height adjustment	Measure the height between disk surface and E, F sensor with a rule.	Height adjusting screw (See 7-5 on page 15).	Adjust the distance between record disk and sensor to 6.5~7mm. 	1. Set a 30cm disk. 2. Stop DD motor. 3. Move the arm to a position 10 away from the center of the disk by the hand. 4. Keep lifter in UP state.
8	B-arm height adjustment	Measure the height between disk surface and E, F sensor with a rule.	Height adjusting screw (See 7-6 on page 15).	Adjust the distance between record disk and sensor to 6.5~7mm. The distance between the disk bisecting plane perpendicular to the disk axis and sensor is to be adjusted to 7~7.5mm as shown below. 	1. Set a 30cm disk. 2. Stop DD motor. 3. Move B-arm to reset position by the hand. 4. Keep lifter in UP state. 5. The adjusting screw appears, if the main power switch is turned off when the disk base is pulled outward to its extreme position by depressing OPEN key without setting any record disk.
9	A-arm E-sensor sensitivity adjustment	Between S-0209 TP3 and GND (fIC16 Pin3) DC voltmeter	fVR5	2.8V±0.1V	1. Set a 30cm disk having no cut grooves. 2. Stop DD motor. 3. Move the arm to a position about 10cm away from the disk center by the hand. Since the adjusting control knob is not rotatable at this position, move the arm to the lead-in position only while rotating the adjusting control knob. 4. Adjust E sensor with the arm kept in UP state and F sensor with the arm kept in DOWN state.
10	A-arm F-sensor sensitivity adjustment	Between S-0209 TP2 and GND (fIC16 Pin26) DC voltmeter	fVR6	2.5V±0.1V	
11	B-arm E-sensor sensitivity adjustment	Between S-0209 TP3 and GND (fIC16 Pin3) DC voltmeter	fVR7	2.8V±0.1V	1. Set a 30cm disk having no cut groovs. 2. Stop DD motor. 3. Move the arm to a position about 10cm away from the disk center by the hand. Since the adjusting control knob is not rotatable at this position, move the arm to the lead-in position only while rotating the adjusting control knob. 4. Adjust E sensor with the arm kept in UP state and F sensor with the arm kept in DOWN state.
12	B-arm F-sensor sensitivity adjustment	Between S-0209 TP2 and GND (fIC16 Pin26) DC voltmeter	fVR8	2.5V±0.1V	

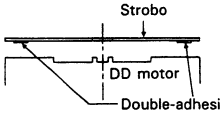
	Adjustment Procedure	Checked Position	Adjusted Parts	Adjustment Contents	Adjusting Conditions
13	A-arm E, F sensor lateral-direction adjustment (Perform this adjustment only where A-arm is in a bad condition even after E, F sensor sensitivity adjustment (Item 11 and 12) and E_2 signal-ready adjustment (Items 15 and 16) have been achieved.)	Between fIC1 Pin11 and GND DC voltmeter	E, F sensor adjustment screw	1. Start music reproduction by selecting a music having a short music intermission interval between two modulated grooves. 2. Adjust the arm so that the stylus comes down onto a position a little ahead of the short music intermission interval and an L-level voltage may be generated the instant the stylus moves across the short music intermission interval. 3. Be sure that the muting is off (music reproduction starts) beginning from the start of the selected music. 4. In the case of the B-arm, it is impossible to see the record disk surface. Therefore, select the same music as in the A-arm and start the music reproduction. The same adjustment as in the A-arm should be made after UP/DOWN indicator light goes off.	1. Set a 30cm disk having a short music intermission interval. 2. Set the sensitivity selector switch to H. 3. Rotate A- or B-arm E, F sensor adjusting screw counterclockwise to its extreme position to move the sensor at a position the nearest to the center of the disk. 4. Rotate delay adjusting control knob (fVR9 or fVR10) counterclockwise (MIN) to its extreme position.
14	B-arm E, F sensor lateral-direction adjustment (Perform this adjustment only where A-arm is in a bad condition even after E, F sensor sensitivity adjustment (Items 11 and 12) and E_2 signal-ready adjustment (Item 15 and 16) have been achieved.)	Between fIC1 Pin11 and GND DC voltmeter	E, F sensor adjusting screw		
15	A-arm E_2 signal delay adjustment	Stylus-down position during automatic music selection operation	fVR9	1. Repeatedly reproduce a music having a short music intermission interval between two modulated glooves by leading-in the arm onto a position a little ahead of the short music intermission interval. 2. Check that when the stylus goes down onto a position ahead of the short music intermission interval, the muting operation is off about 4 ~ 6 secs after the stylus tip is brought into contact with the disk. 3. In the case of the B-arm, it is impossible to see the record disk surface. Therefore, select the same music as in the A-arm and start the music reproduction. Be sure that the muting is off about 4 ~ 6 secs after the UP/DOWN indicator light goes off.	1. Set a 30cm disk having a short music intermission interval. 2. Set the sensitivity selector switch to H.
16	B-arm E_2 signal delay adjustment	Stylus-down position during automatic music selection operation	fVR10		
17	A-arm lead-in adjustment	Lead-in position	Adjusting cam	1. Lead-in the arm onto a 30cm disk during automatic disk selection operation and adjust the arm so that the stylus can come down onto the lead-in groove. 2. Check the lead-out operation, simultaneously. After the B-arm is led out, the A-am operation begins, the A-arm returns to its reset position. 3. Confirm 1.2 above in 17 cm disk as well.	1. Set the sensitivity selector switch to M. 2. Set a 30cm disk. 3. Set a 17cm disk after the above 30cm disk adjustment.
18	B-arm lead-in adjustment				
19	DD motor speed adjustment to 33rpm	Motor revolution speed	eVR1 S-0206	Adjust the motor speed so that a strobo pattern of 33rpm appears to be stopped. (only adjustment in the normal direction.)	1. Remove motor frame and place it as shown in Fig. 4-3 on page 6. 2. Put the strobo pattern center at the disk center and fix the pattern by a double-adhesive tape. 3. Remove the 6-lead parallel cord from board S-0206 as shown and then connect the +15V lead and the GND lead to 15V terminal and GND terminal of the 6-pin connector, respectively. 4. Connect a resistor to 6-pin connector as shown. 5. The motor speed can be selected as shown in the Table by switching the circuit. **Note)** There exists a set where apertures are formed in board F-O206 on the back side of eVR1 and eVR2. In the set of this type, it is possible to adjust the motor speed after setting a 30cm disk and mounting a strobo pattern on the disk, without removing the motor frame.
20	DD motor speed adjustment to 45rpm	Motor revolution speed	eVR2 S-0206	Adjust the motor speed so that a strobo pattern of 45rpm appears to be stopped.	
21	Mechanical sensors are used when eVR3 and eVR5 are replaced. In the case where eVR4 is mounted, do not touche it.				



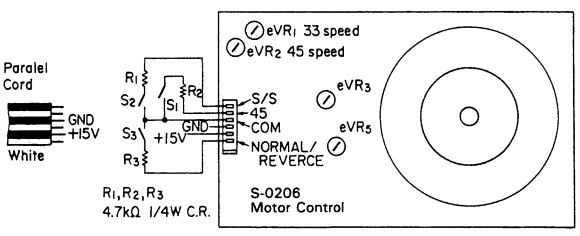








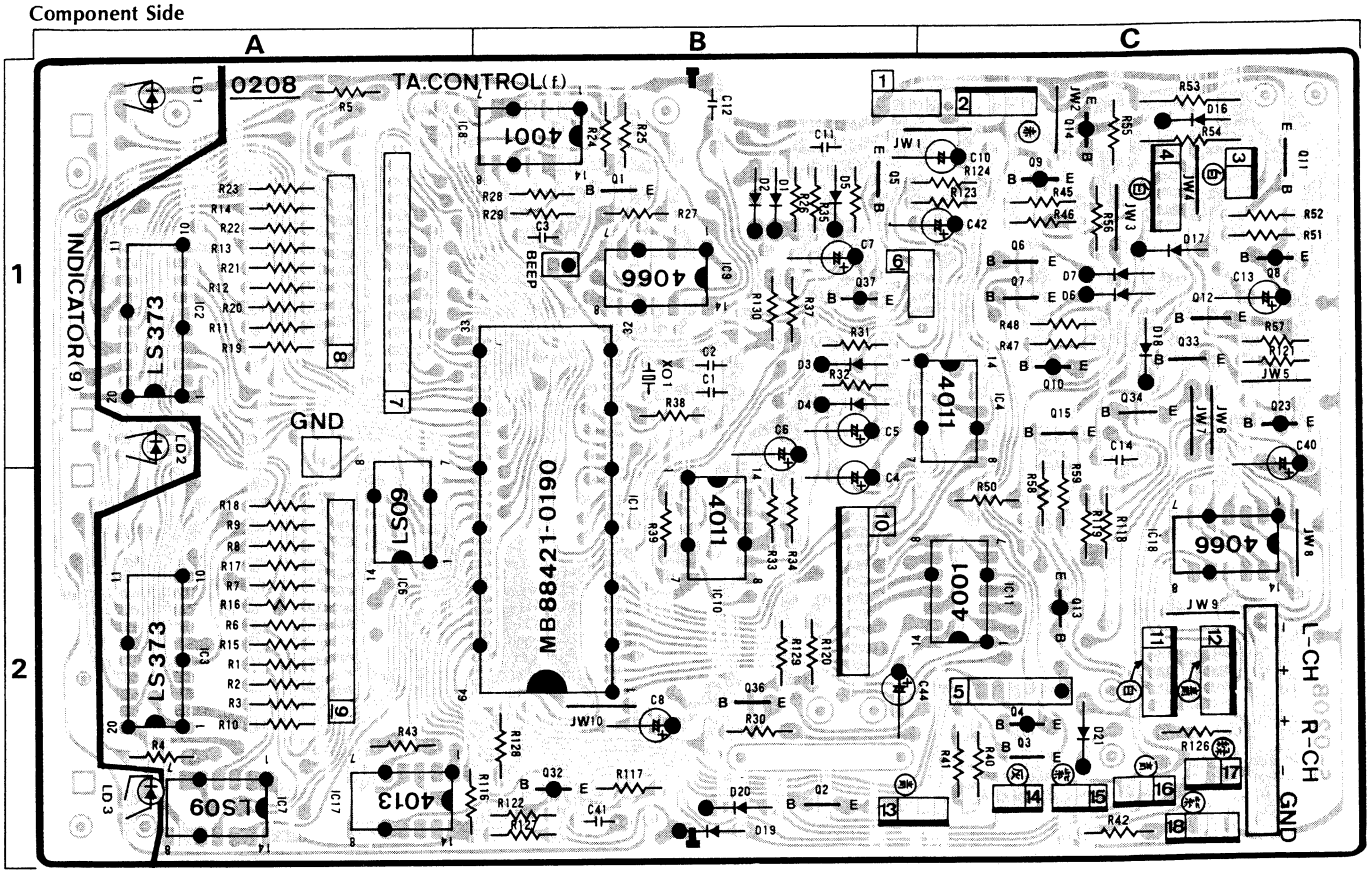
	$S_1 \sim S_3$	
	OPEN	CLOSE
S_1	33rpm	45rpm
S_2	TURN	STOP
S_3	NORMAL A Arm	REVERSE B Arm



5. PARTS LOCATION & PARTS LIST

5-1. S-0208 Micro Computor Circuit Board (Stock No. 13271101)

Component Side



Parts List

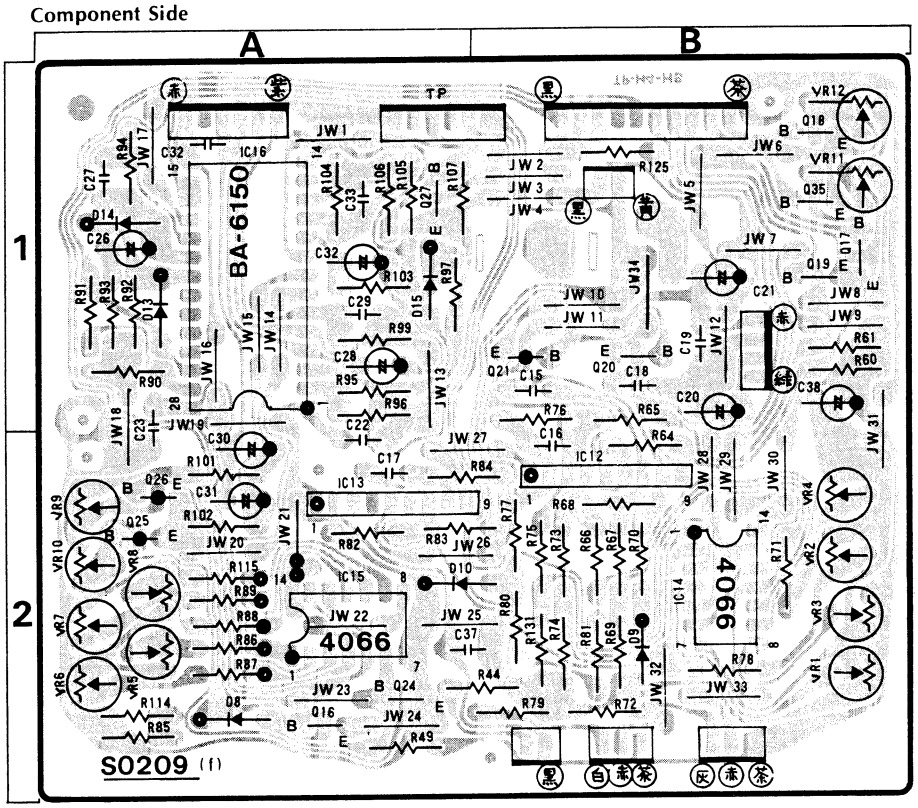
Parts No.	Stock No.	Description
•Transistor		
fQ1	46719900	DTC124
fQ2	46719900	DTC124
fQ3	46719800	DTA124
fQ4	46719900	DTC124
fQ5	46719900	DTC124
fQ6	46719900	DTC124
fQ7	46719900	DTC124
fQ8	46719800	DTA124
fQ9	46614001	2SA1283
	or 48000801	2SA934
fQ10	46614001	2SA1283
	or 48000801	2SA934
fQ11	46614101	2SC3243
	or 48000901	2SC2060
fQ12	46719900	DTC124
fQ13	46719800	DTA124
fQ14	46614001	2SA1283
	or 48000801	2SA934
fQ15	46614101	2SC3243
	or 48000901	2SC2060
fQ23	46719800	DTA124
fQ32	46719800	DTA124
fQ33	46540801	2SC2878
	or 46604301	2SC3327
fQ34	46540801	2SC2878
	or 46604301	2SC3327
fQ36	46719900	DTC124
fQ37	46719800	DTA124
•IC		
fIC1	46938600	MB88421-130
fIC2	48003200	MB74L373
	or 48053800	HD74LS373
	or 48053900	M74LS373P

Parts No.	Stock No.	Description
fIC3	48003200	MB74LS373
	or 48053800	HD74LS373
	or 48053900	M74LS373P
fIC4	03604100	TC4011P
	or 07207200	MB84011BM
	or 46427200	μPD4011BC
fIC6	46160200	MB74LS09
	or 46160300	M74LS09
	or 48053700	HD74LS09
fIC7	46160200	MB74LS09
	or 46160300	M74LS09
	or 48053700	HD74LS09
fIC8	03610500	TC4001BP
	or 07186600	MB84001BM
	or 46443800	μPD4001BC
	or 48050000	MSM4001BRS
fIC9	07224800	TC4066BP
	or 07264600	MSM4066RS
	or 46164300	MB84066B
	or 46421000	μPD4066BC
fIC10	03604100	TC4011P
	or 07207200	MB84011BM
	or 46427200	μPD4011BC
fIC11	03610500	TC4001BP
	or 07186600	MB84001BM
	or 46443800	μPD4001BC
	or 48050000	MSM4001BRS
fIC17	07107500	TC4013BP
	or 07207300	MB84013BM
	or 48050200	MSM4013BRS
	or 48053600	μPD4013BC
fIC18	07224800	TC4066BP
	or 07264600	MSM4066RS
	or 46164300	MB84066B
	or 46421000	μPD4066BC

Parts No.	Stock No.	Description
fXO1	46925800	Quartz Element KBR-4.19M
•Diode		
fD1	03117600	1S2473T77
fD2	03117600	1S2473T77
fD3	03117600	1S2473T77
fD4	03117600	1S2473T77
fD5	03117600	1S2473T77
fD6	03117600	1S2473T77
fD7	03117600	1S2473T77
fD16	03117600	1S2473T77
fD17	03117600	1S2473T77
fD18	03117600	1S2473T77
fD19	03117600	1S2473T77
fD20	03117600	1S2473T77
fD22	03117600	1S2473T77
fD23	03117600	1S2473T77
fD24	03117600	1S2473T77
fQ29	03900100	Photo Transistor, PH101
fEP1	07244900	Buzzer PKM12
•LED		
gLD1	46162500	SLR54URC5
gLD2	46162500	SLR54URC5
gLD3	46162500	SLR54URC5

5-2. S-0209 Tone Arm Control Circuit Board (Stock No. 13271201)

Component Side

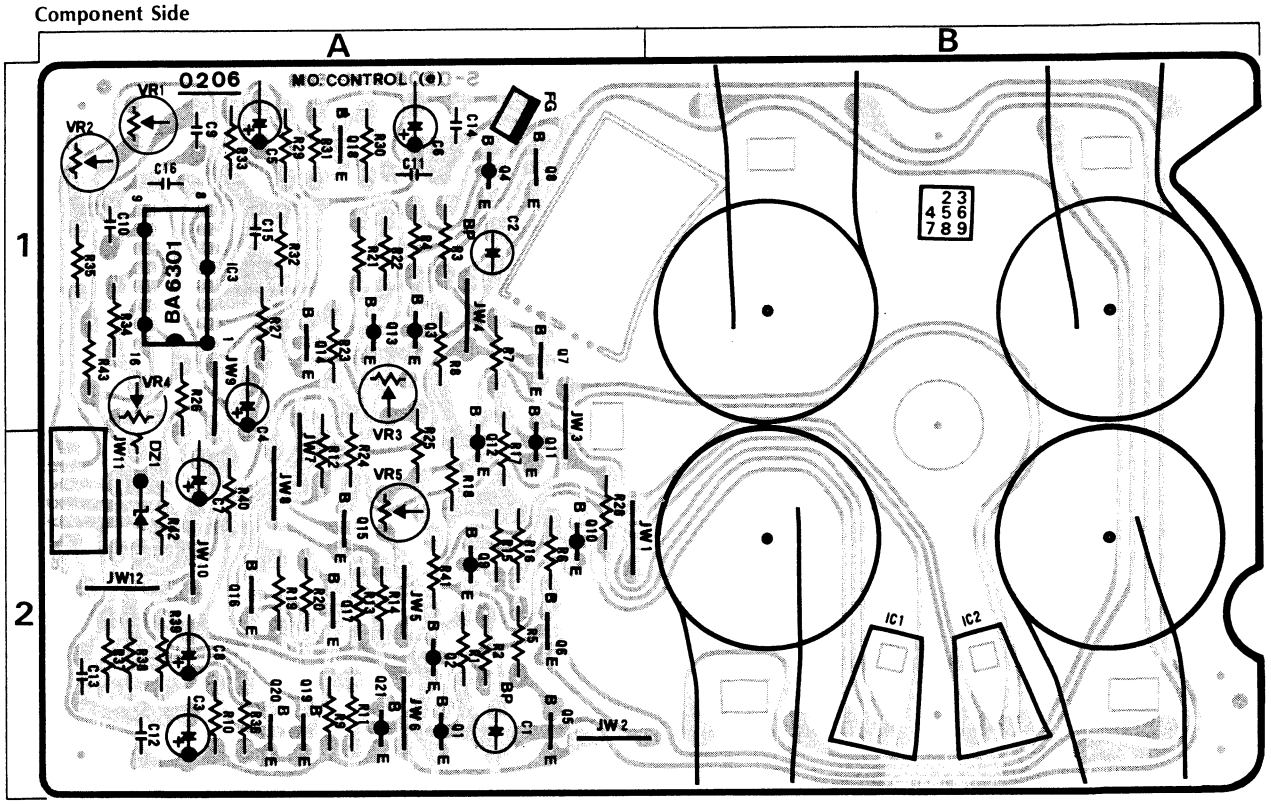


Parts List

Parts No.	Stock No.	Description
•Transistor		
fQ16	46719900	DTC124
fQ17	46719900	DTC124
fQ18	46719900	DTC124
fQ19	46719900	DTC124
fQ20	03083901	2SD313AL
fQ21	03032301	2SB507V11AL
fQ24	46719900	DTC124
fQ25	46719800	DTA124
fQ26	46719800	DTA124
fQ27	46719900	DTC124
fQ35	46719900	DTC124
•IC		
fIC12	46087100	NJM4558S
	or 46146500	BA715
	or 46147700	M5218L
fIC13	46087100	NJM4558S
	or 46146500	BA715
	or 46147700	M5218L
fIC14	07224800	TC4066BP
	or 07264600	MSM4066RS
	or 46164300	MB84066B
	or 46421000	μPD4066BC
fIC15	07224800	TC4066BP
	or 07264600	MSM4066RS
	or 46164300	MB84066B
	or 46421000	μPD4066BC
fIC16	46321300	BA6150
•Diode		
fD8	03117600	1S2473T77
fD9	03117600	1S2473T77
fD10	03117600	1S2473T77
fD13	03117600	1S2473T77
fD14	03117600	1S2473T77
fD15	03117600	1S2473T77
fC26	46407600	22μF 25V E.C.
fC27	46284100	0.1μF 50V F.C.
fC29	46282400	3300pF 50V F.C.
fC33	46282600	4700pF 50V F.C.
fC39	00305600	22μF 25V E.B.
fVR1	46634100	4.7kΩ S.V.R., A Arm Servo Adjust
	or 46918600	5kΩB S.V.R., A Arm Servo Adjust
fVR2	46634500	22kΩ S.V.R., A Arm Interrupter
	or 46918800	20kΩB S.V.R., A Arm Interrupter
fVR3	46634100	4.7kΩ S.V.R., B Arm Servo Adjust
	or 46918600	5kΩB S.V.R., B Arm Servo Adjust
fVR4	46634500	22kΩ S.V.R., B Arm Interrupter
	or 46918800	20kΩB S.V.R., B Arm Interrupter
fVR5	46635100	220kΩ S.V.R., A Arm E Sensor
	or 46919200	200kΩB S.V.R., A Arm E Sensor
fVR6	46635100	220kΩ S.V.R., A Arm F Sensor
	or 46919200	200kΩB S.V.R., A Arm F Sensor
fVR7	46635100	220kΩ S.V.R., B Arm E Sensor
	or 46919200	200kΩB S.V.R., B Arm E Sensor
fVR8	46635100	220kΩ S.V.R., B Arm F Sensor
	or 46919200	200kΩB S.V.R., B Arm F Sensor
fVR9	46635300	470kΩ S.V.R., A Arm Delay
	or 46919400	500kΩB S.V.R., A Arm Delay
fVR10	46635300	470kΩ S.V.R., B Arm Delay
	or 46919400	500kΩB S.V.R., B Arm Delay
fVR11	46634700	47kΩ S.V.R., A Arm Lead-in
	or 46919000	50kΩB S.V.R., A Arm Lead-in
fVR12	46634700	47kΩ S.V.R., B Arm Lead-in
	or 46919000	50kΩB S.V.R.M B Arm Lead-in

5-3. S-0206 Motor Control Circuit Board (with DD Motor for Disk Drive)

Component Side



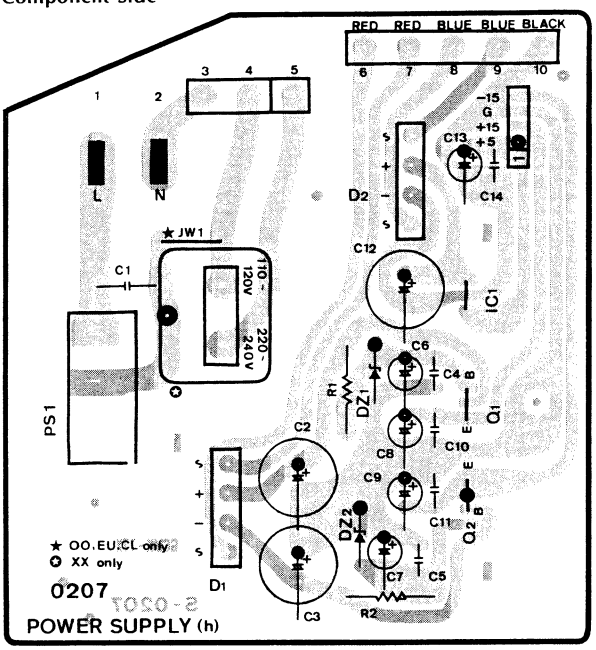
Parts List

Parts No.	Stock No.	Description
•Transistor		
eQ1	46359701	2SA952
eQ2	46359701	2SA952
eQ3	46359701	2SA952
eQ4	46359701	2SA952
eQ5	46359801	2SC2001
eQ6	46359801	2SC2001
eQ7	46359801	2SC2001
eQ8	46359801	2SC2001
eQ9	46367001	2SA1115
	or 46367201	2SA1048
	or 46392001	2SA1175
eQ10	46367001	2SA1115
	or 46367201	2SA1048
	or 46392001	2SA1175
eQ11	46367001	2SA1115
	or 46367201	2SA1048
	or 46392001	2SA1175
eQ12	46367001	2SA1115
	or 46367201	2SA1048
	or 46392001	2SA1175
eQ13	46367001	2SA1115
	or 46367201	2SA1048
	or 46392001	2SA1175
eQ14	46367101	2SC2603
	or 46367301	2SC2458
	or 46391901	2SC2785
eQ15	46367101	2SC2603
	or 46367301	2SC2458
	or 46391901	2SC2785
eQ16	46367101	2SC2603
	or 46367301	2SC2458
	or 46391901	2SC2785
eQ17	46367101	2SC2603
	or 46367301	2SC2458
	or 46391901	2SC2785

Parts No.	Stock No.	Description
eQ18	46367101	2SC2603
	or 46367301	2SC2458
	or 46391901	2SC2785
eQ19	46367101	2SC2603
	or 46367301	2SC2458
	or 46391901	2SC2785
eQ20	46367101	2SC2603
	or 46367301	2SC2458
	or 46391901	2SC2785
eQ21	46614001	2SA1283
•IC		
eIC1	46354301	HW-301C-Q
	or 46354302	HW-301C-R
eIC2	46354301	HW-301C-Q
	or 46354302	HW-301C-R
eIC3	46354400	BA6301
•Zener Diode		
eDZ1	46113900	05Z12-Y
eR43	48056500	270Ω 1/4W C.R.
eC1	46925400	25V 22μF E.B.
eC2	46925400	25V 22μF E.B.
eC9	46283100	0.015μF 50V F.C.
eC10	46282900	0.01μF 50V F.C.
eC11	46282700	6800pF 50V F.C.
eVR1	46739000	100kΩ S.V.R., 33rpm speed
eVR2	46635300	470kΩ S.V.R., 45rpm speed
	or 46919400	500kΩB S.V.R., 45rpm speed
eVR3	46634700	47kΩ S.V.R., Wow & flutter
	or 46919000	50kΩB S.V.R., Wow & flutter
eVR5	46633700	1kΩB S.V.R., Wow & flutter
	or 46918300	1kΩB S.V.R., Wow & flutter

5-4. S-0207 Power Supply Circuit Board

Component Side (Stock No. 13271001)

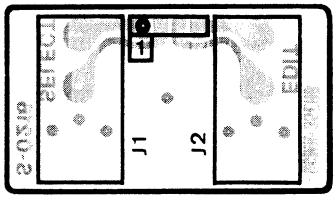


Parts List

Parts No.	Stock No.	Description
•Transistor		
⚠ hQ1	03083901	2SD313AL
⚠ hQ2	46149301	2SB744
•IC		
⚠ hIC1	46720300	μPC7805H
⚠	or 48053500	NJM7805
•Diode		
⚠ hD1	03117000	RB-152
⚠ hD2	03117000	RB-152
•Zener Diode		
hDZ1	46104300	05Z15-Y
hDZ2	46104300	05Z15-Y
⚠ hC1	46425800	0.01μF 400V C.C.
⚠	or 46943200	0.01μF 400V C.C.
⚠ hSW1	46413900	Push SW., POWER
⚠ hR1	00136000	560Ω 1/2W N.I.R.
⚠ hR2	00136000	560Ω 1/2W N.I.R.

5-5. S-0216 COMPU EDIT/SELECTOR Circuit Board

Component Side

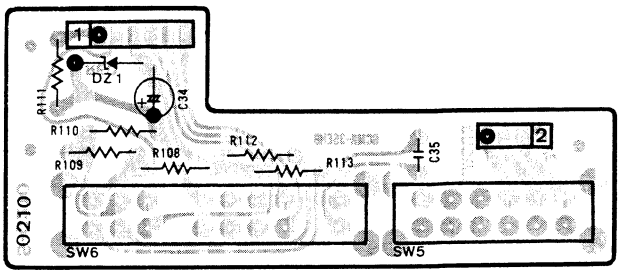


Parts List

Parts No.	Stock No.	Description
J1	46547200	COMPU EDIT Jack
J2	46547200	COMPU SELECTOR Jack

5-6. S-0210 Sensitivity Switch Circuit Board

Component Side

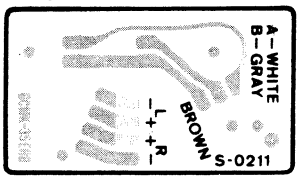


Parts List

Parts No.	Stock No.	Description
•Zener Diode		
fDZ1	46103100	05Z10-Y
fC35	46701700	0.22μF 50V F.C.
gSW6	46935810	Slide SW., Speed Adjust
gSW7	46935900	Slide SW., Sensitivity Adjust

5-7. S-0211 A Arm Servo Sensor Circuit Board

Component Side



Parts List

Parts No.	Stock No.	Description
fQ30	46938400	Photo Interrupter ON1128
fQ31	46938400	Photo Interrupter ON1128

5-8. S-0215 30cm Disk Sensor Circuit Board

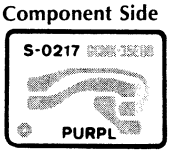
Component Side

Parts List

Parts No.	Stock No.	Description
•LED		
fLD1	07205900	LD261

5-9. S-0217 Pulse Sensor Circuit Board

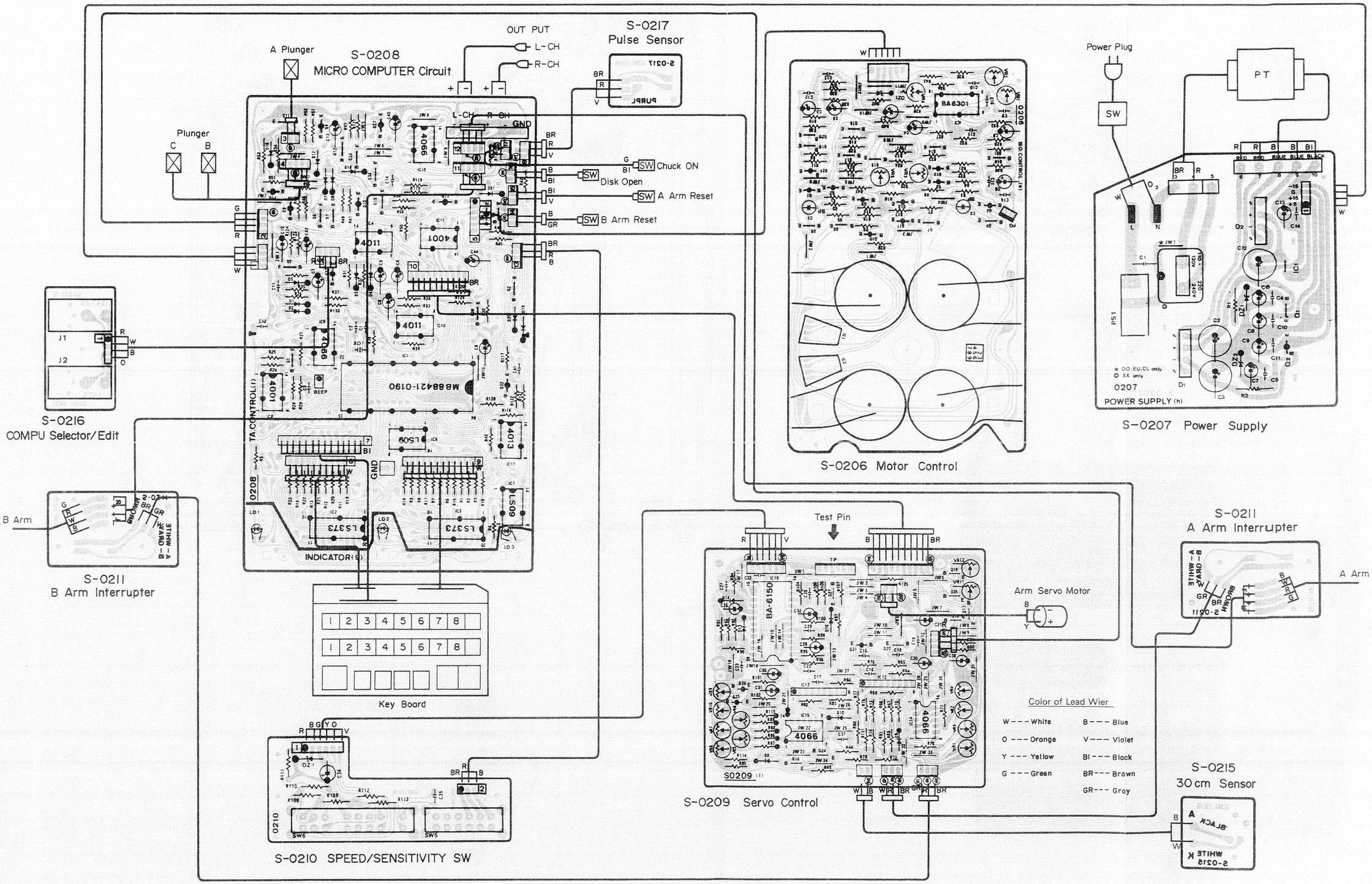
Component Side



Parts List

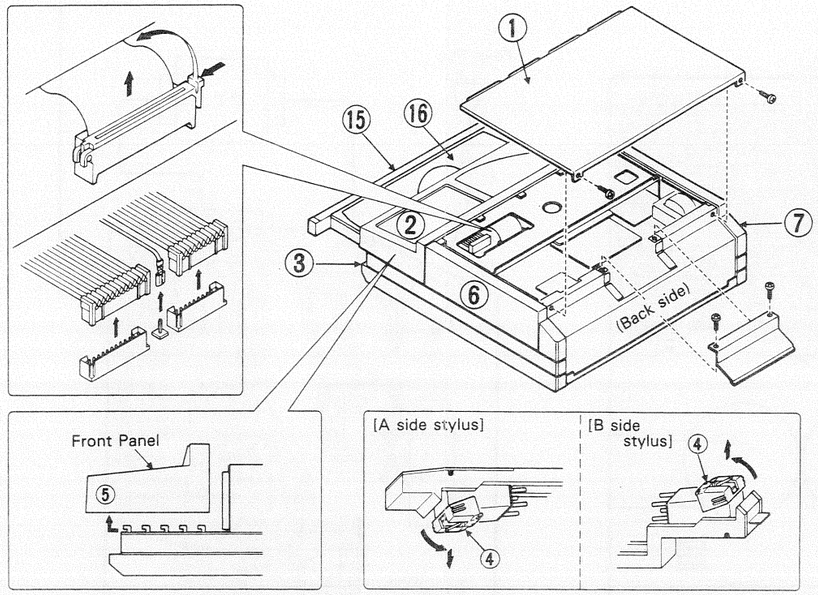
Parts No.	Stock No.	Description
fQ28	46603900	Photo Interrupter GP-1S03

6. WIRING DIAGRAM

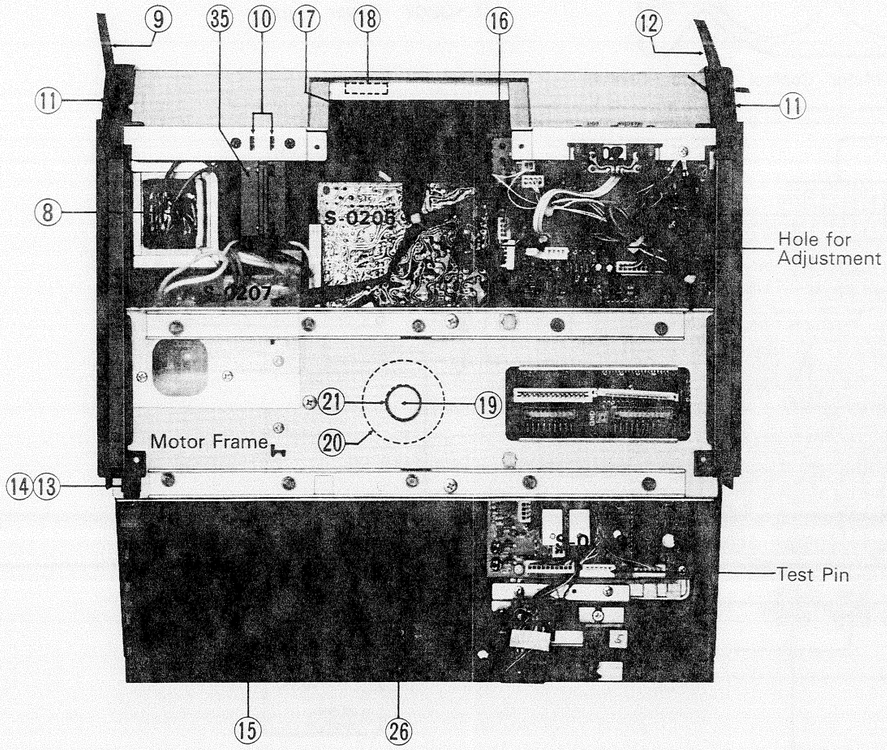


7. OTHER PARTS

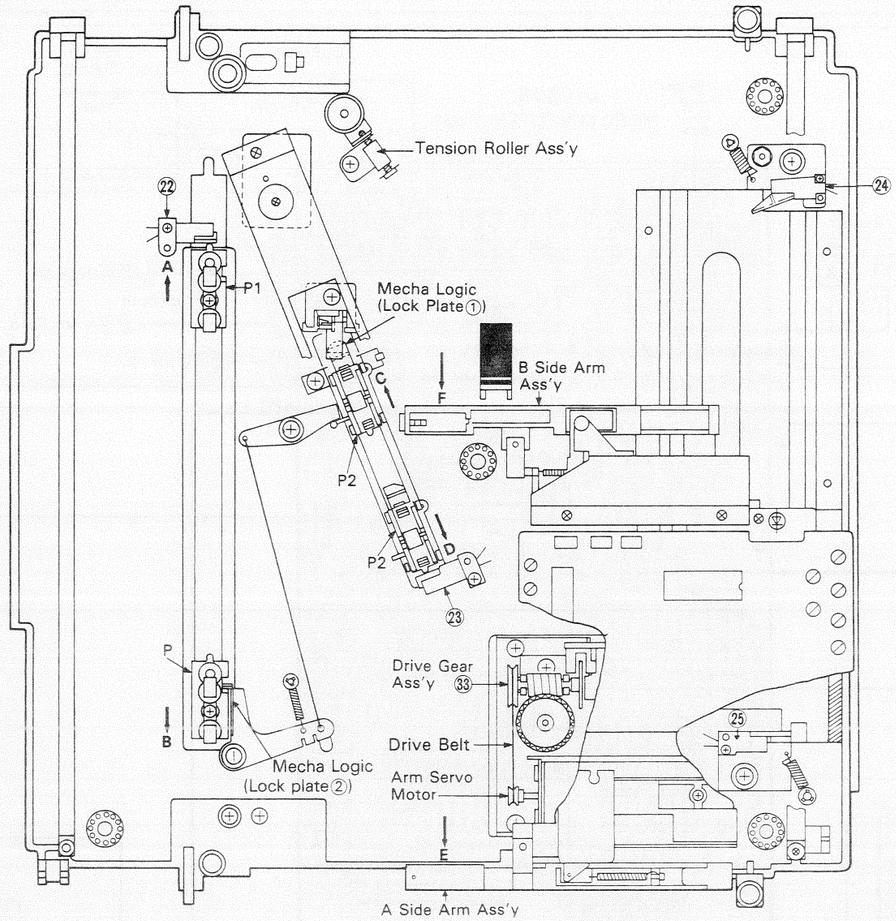
7-1. Front View



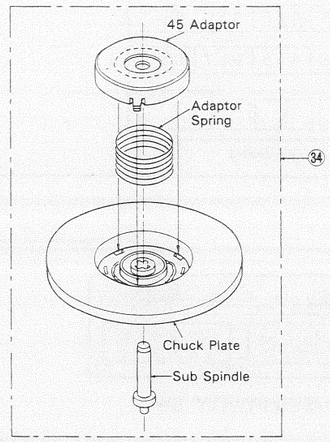
7-2. Top View



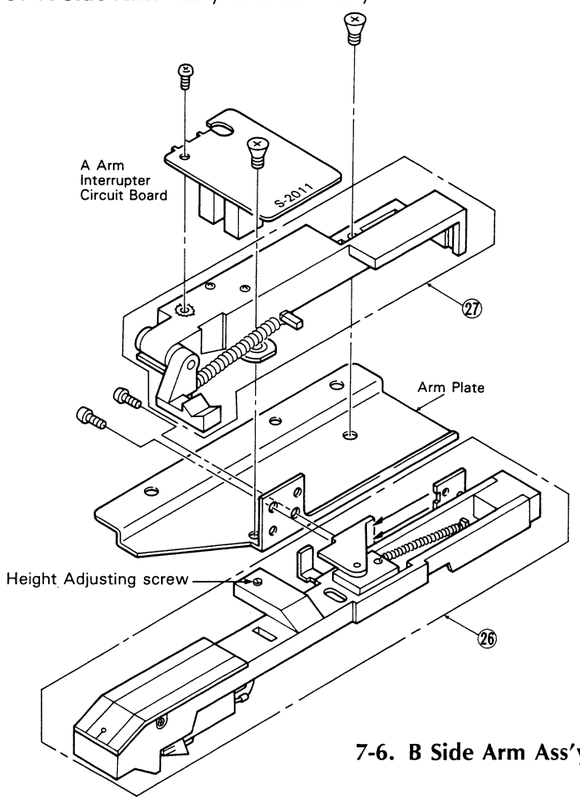
7-3. Top View of Main Chassis



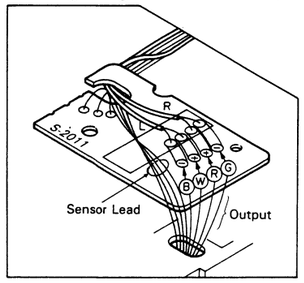
7-4. Chuck Plate



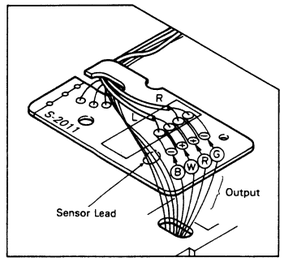
7-5. A Side Arm Ass'y & Lifter Ass'y



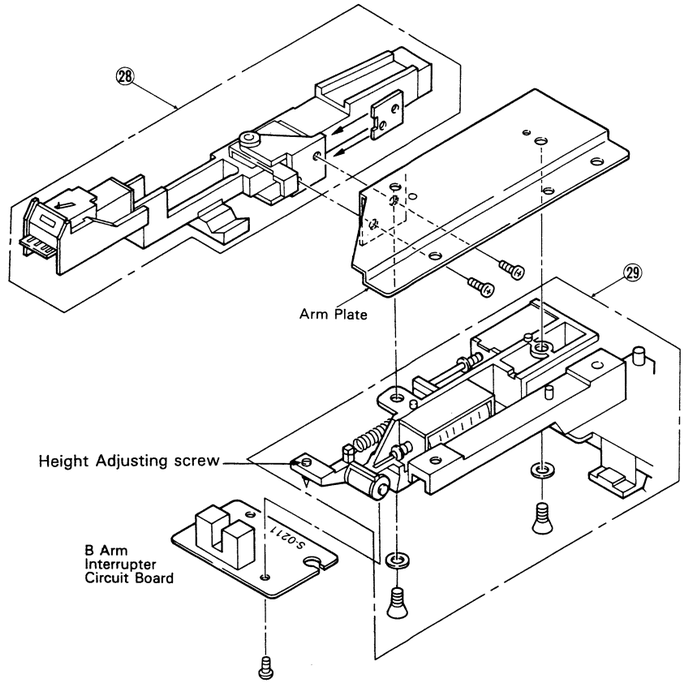
•Wiring Diagram of S-0211 (A Arm Side)



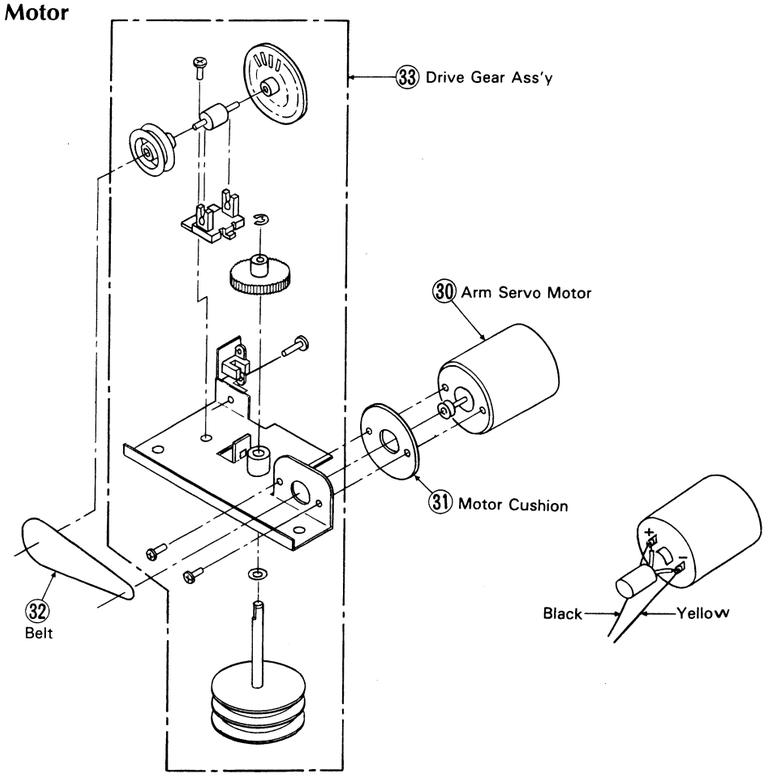
•Wiring Diagram of S-0211 (B Arm Side)



7-6. B Side Arm Ass'y & Lifter Ass'y



7-7. Arm Servo Motor



Parts List

Parts No.	Stock No.	Description
1	13286410	Top Plate (Silver Model)
	13290010	Top Plate (Black Model)
2	13284610	Key Board Ass'y (Silver Model) <XX,CSA,EU,BS,AS>
	13294810	Key Board Ass'y (Black Model) <XX,CSA,EU,BS,AS>
	13310400	Key Board Ass'y (Silver Model) <UL>
	13310500	Key Board Ass'y (Black Model) <UL>
3	13273800	Front Cover
4	13303300	Stylus SN-909, for A arm and B arm
5	13273910	Front Panel Ass'y (Silver Model) <XX,CSA,EU,BS,AS>
	13294510	Front Panel Ass'y (Black Model) <XX,CSA,EU,BS,AS>
	13310600	Front Panel Ass'y (Silver Model) <UL>
	13310700	Front Panel Ass'y (Black Model) <UL>
6	13273700	Side Panel, right side (Silver Model)
	13291200	Side Panel, right side (Black Model)
7	13273600	Side Panel, left side (Silver Model)
	13291100	Side Panel, left side (Black Model)
⚠ 8	15014901	Power Transformer <XX>
⚠	15014902	Power Transformer <UL,CSA>
⚠	15014905	Power Transformer <EU,BS,AS>
⚠ 9	46413200	Power Supply Cord <XX,CSA>
⚠	38004700	Power Supply Cord <UL>
⚠	38004500	Power Supply Cord <EU>
⚠	38004300	Power Supply Cord <BS>
⚠	07204200	Power Supply Cord <AS>

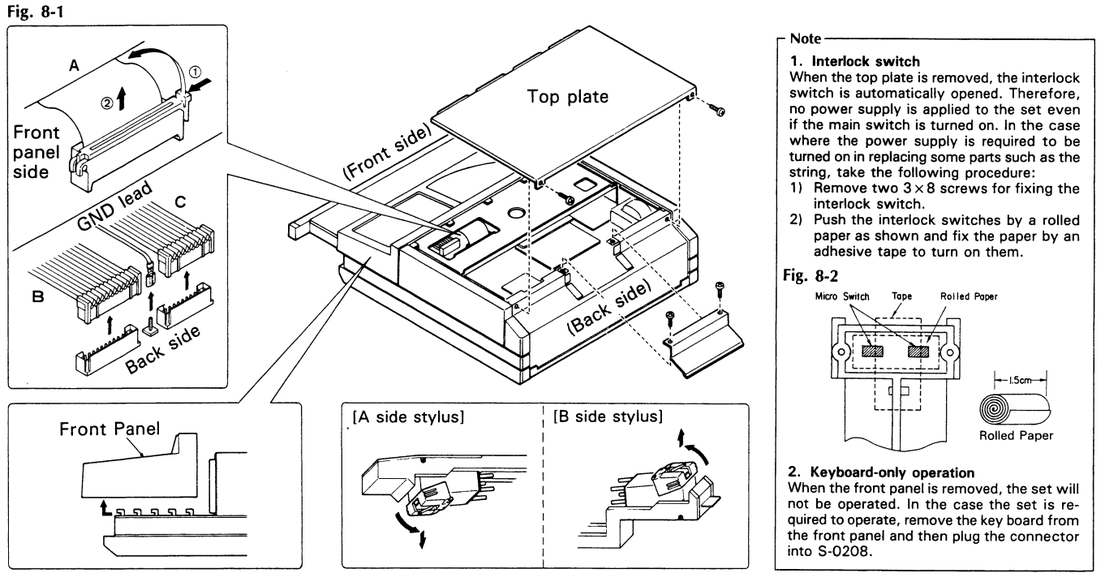
Parts No.	Stock No.	Description
⚠10	46941300	Switch for Power Supply
11	13278800	Cord Cover
12	13234400	Output Cord with Pin Plug <XX,CSA,EU,BS,AS>
	13234500	Output Cord with Pin Plug <UL>
⚠13	46413900	POWER Switch
14	13280900	Knob, POWER Switch
15	18096500	Disk Base Ass'y (Silver Model)
	18096400	Disk Base Ass'y (Black Model)
16	18096700	Disk Plate Ass'y (Silver Model)
	18096600	Disk Plate Ass'y (Black Model)
17	13274000	Pick-up Brush A
18	13274100	Pick-up Brush B
19	18083900	DD Motor for Disk Drive (with S-0260)
20	13260300	T.T. Sheet
21	13260400	Lock Bush
22	46926900	Micro Switch, disk open
23	46926900	Micro Switch, chuck ON
24	46925200	Micro Switch, B arm reset
25	46925200	Micro Switch, A arm reset
26	18095700	A Side Arm Ass'y
27	13284410	A Side Lifter Ass'y with Plunger A
28	18095400	B Side Arm Ass'y
29	13284510	B Side Lifter Ass'y with Plunger B,C
30	46935700	Arm Servo Motor
31	13288900	Motor Cushion
32	13281100	Drive Belt
33	18085600	Drive Gear Ass'y
34	18086300	Chuck Plate Ass'y
35	13289100	Switch Case
36	13266700	Wire Stopper (L plate) (Refer Fig.8-6 on page 16)

8. HOW TO REPLACE MAIN PARTS

A. Front panel and Stylus

1) Depress OPEN key to take out the disk base. Turn off the power supply by depressing the POWER switch when the disk base comes out about 10cm. Remove two 3×8 black screws from the back side, and the top plate.
2) Carefully extract the A-surface stylus holder in the arrow direction as shown while holding the cartridge by the hand. Mount a new stylus by carefully pushing it in the opposite direction. Take care not to touch the finger to the stylus tip.
3) Mount the top plate and turn on the power supply. Then, turn off the power supply the moment the A-arm comes near the front panel window.
4) Disconnect three connectors A, B, C and GND lead.
5) Carefully pull the front panel toward you and remove the right- and left-side stoppers, separately. Take care that the connector is not caught by other parts.
6) In the same way as in the A-surface stylus holder, carefully extract the B-surface stylus holder in the arrow direction as shown while holding the cartridge by the hand. Take care not to touch the finger to the stylus tip.
7) Fit the front panel to the right- and left-side stoppers and then connect the connectors A, B, C and the GND lead.
In doing this, take care that the power switch is not brought into contact with the under surface of the panel. Further, in fitting the connector, do not apply an excessive force to the board.
8) Fix the rear side cover and the top plate by two screws, respectively.
9) Check that the disk base is automatically pulled in when the power switch is turned on.

Fig. 8-1



Note

1. Interlock switch
When the top plate is removed, the interlock switch is automatically opened. Therefore, no power supply is applied to the set even if the main switch is turned on. In the case where the power supply is required to be turned on in replacing some parts such as the string, take the following procedure:
1) Remove two 3×8 screws for fixing the interlock switch.
2) Push the interlock switches by a rolled paper as shown and fix the paper by an adhesive tape to turn on them.

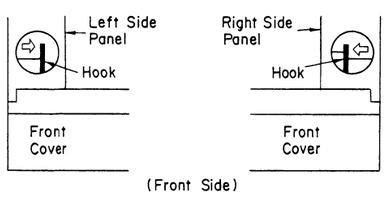
Fig. 8-2

2. Keyboard-only operation
When the front panel is removed, the set will not be operated. In the case the set is required to operate, remove the key board from the front panel and then plug the connector into S-0208.

B. Front cover (See Fig. 8-3)

1) Unhook the front cover through the apeatures formed on this side of the right- and left-side panel and then extract the front cover toward you.

Fig. 8-3



C. How to remove keyboard

1) Remove the top plate and front panel.
2) Remove two 3×8 screws for fixing the keyboard to the front panel.

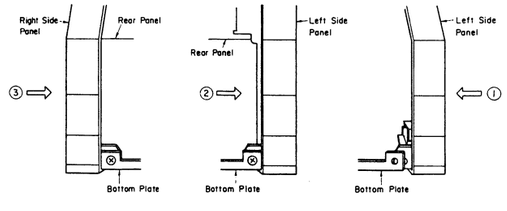
D. How to remove side panels (See Fig. 8-4)

1) Remove the top plate, front panel and front cover.
2) Remove two 3×8 screws for fixing the side panels and top plate.
3) Extract the right- and left-side panels.
4) Remove the rear panel.

E. How to install side panels (See Fig. 8-4)

1) Fit the left-side panel to the bottom plate. ①
2) Fit the back-side panel to the left-side panel and then fix it with the 3×8 screws. ②
3) Fit the right-side panel to the bottom plate and the back-side panel and then fix it with the 3×8 screws. ③
4) Fit the front cover to the right- and left-side panels.

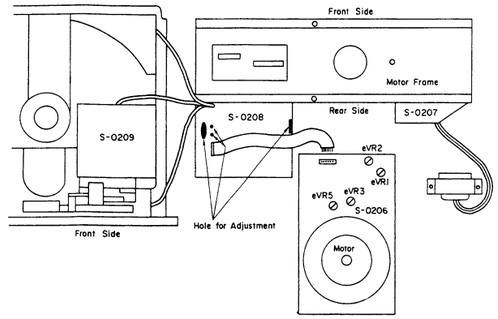
Fig. 8-4



F. How to remove disk driving DD motor with control board

1) Remove the top plate, front panel, front cover, right- and left-side panels, and back-side panel.
2) Remove four 4×8 binding screws for fixing the motor frame.
3) Place the removed motor frame on the right hand of the set with it set front-side back.
4) Remove three 4×12 screws for mounting the motor.

Fig. 8-5



G. How to remove A-arm assembly and lifter assembly (See page 15)

1) Remove the top plate and front panel.
2) Disconnect the lead extending from the arm of board S-0211.
3) Remove a 2×4 binding screw for mounting board S-0211.
4) Remove two 2×4 flat-head screws for fixing the lifter assembly.

H. How to remove B-arm assembly and lifter assembly (See page 15)

1) Remove the top plate, front panel, front cover, right- and left-side panels, back-side panel, and motor frame.
2) Set the B-arm at its reset position by pulling the table disk to its extreme end. (Turn on OPEN key and then off when the disk base is pulled out extremely.)
3) Remove the B-arm stylus.
4) Remove two 3×8 screws fixing the arm plate.
5) Perform the same procedure from (2) to (4) stated in item G above.

I. How to remove disk base and disk plate (See Fig. 8-7)

Fig. 8-6

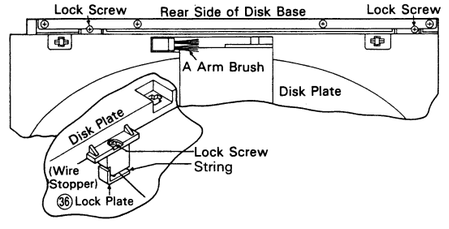
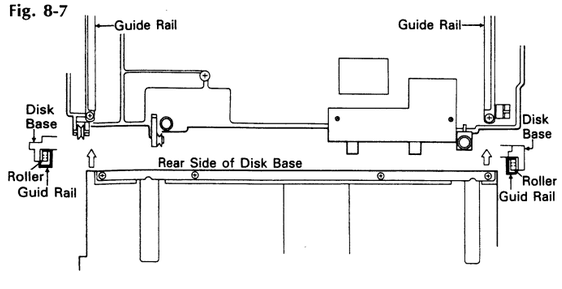


Fig. 8-7

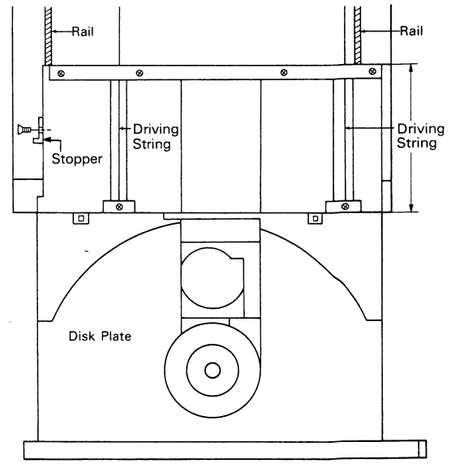


1) Remove the top plate, front panel, front cover, right- and left-side panels, and back-side panel.
2) Pull the disk base table toward you to its extreme front end by depressing OPEN key.
3) Loosen screws for fixing mechanism-driving strings to the disk table. Remove the metal fixture from the string. (Take care not to remove the fixture from the string by excessively lossening the screw.)
4) Remove a 3×8 fixture screw positioned on the left side of the disk base.
5) Extract the disk base together with the disk plate.

J. How to install disk base and disk plate (See Figs. 8-6, 8-7, and 8-8)

1) Depress OPEN key to move the movable pulley P_1 to position A, the movable pulley P_2 to position C and the A and B-arms to positions E and F, respectively.
2) Fit the disk plate onto the disk base.
3) Mount the disk plate onto the rail and then push it about 10cm. Fix the disk plate with a metal fixture located at the left end of the disk base.
4) Pull the disk plate to its extreme front end and then hang two right and left strings on the string fixing fixture located on the plate end portion.
5) By depressing OPEN/CLOSE key, push the disk table to its extreme rear position by the hand, when the movable pully P_1 moves from position A to position B, as shown in Fig. 7-3 on page 14.
6) Push the disk plate to a position where the disk plate is tightly in contact with the rear portion of the disk base.
7) Tighten two string fixing screws. The string drives the mechanism of the disk plate.
8) Be sure that the disk base and disk plate move normally by depressing OPEN/CLOSE key.

Fig. 8-8

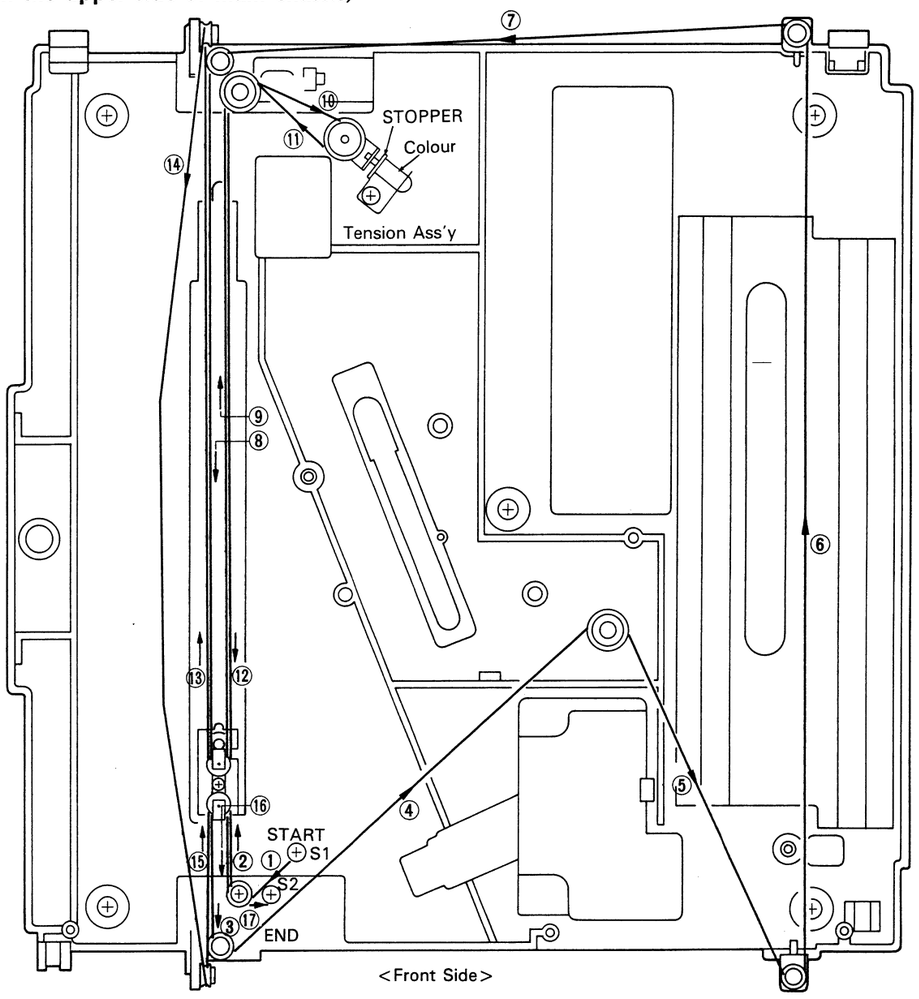


K. How to remove drive gear assembly and arm servomotor (See Fig. 7-7 on page 15)

1) Set the A-arm at it extreme rear position. (Turn on OPEN Key and turn off the main switch when the A-arm reaches the extreme rear end position.)
2) Remove the top plate, front panel, front cover, right- and left-side panels and the rear panel.
3) Remove the disk plate and disk base.
4) Remove screws for mounting the arm servomotor.
5) Remove screws for mounting the drive gear assembly.

9. HOW TO REPLACE MECHANISM DRIVING STRING

(On the upper side of main chassis)



•Replacement procedure

1. Remove the top plate, front panel, side plates and rear panel.
2. Remove the motor frame.
3. Remove the disk table and disk plate.
4. Make a knot around the screw S_1, stretch the string in accordance with procedure from 1 to 17, and tie up the string end around the screw S_2.
5. After having assembled the set completely, turn on the main switch to make sure that the disk table and disk plate opens or closes normally and that the normal music reproduction can be made.

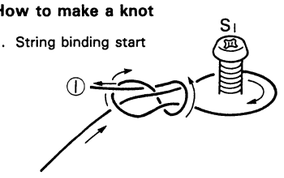
Note) Adjust the tension of the streched string by the use of the adjusting screw of the tension assemble so that the collar is brought into contact with the stopper as shown above.

Parts List

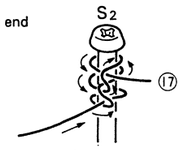
Parts No.	Stock No.	Description
1	60360530	Driving String (3m)
2	13303500	Tension Roller Ass'y

*** How to make a knot**

1. String binding start

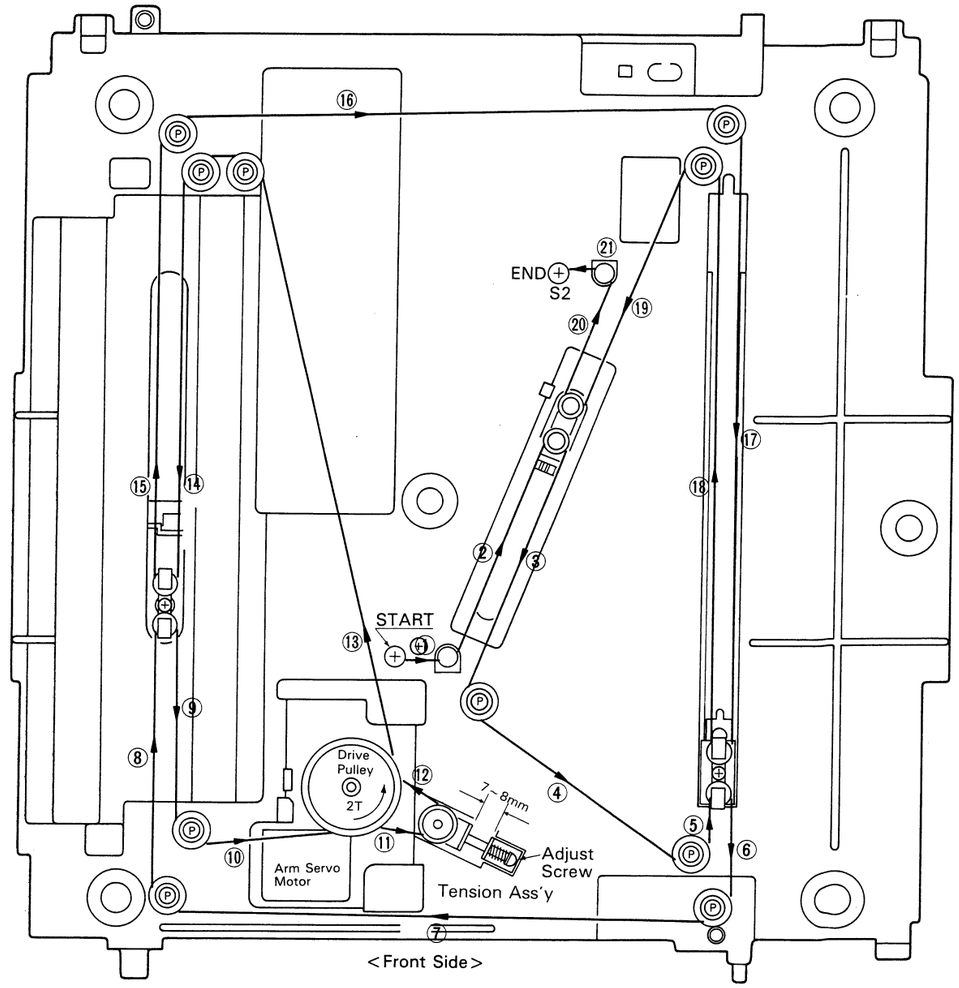


2. String binding end



10. HOW TO REPLACE MECHANISM DRIVING STRING

(On the back side of main chassis)



•Replacement procedure

1. Remove the top plate, front panel, side plates and rear panel.
2. Remove the motor frame.
3. Remove the disk table and disk plate.
4. Remove four screws for fixing the main chassis, and then turn the main chassis upside down.
5. Make a knot around the screw S_1, stretch the string in acordance with procedure from 1 to 21, and tie up the string end around the screw S_2.
6. After having assembled the set completely, turn on the main switch to make sure that the disk table and disk plate opens or closes normally and that the normal music reproduction can be made.

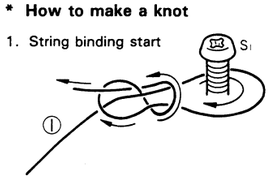
Note) Adjust the tension of the stretched string by the use of the adjusting screw of the tension assembly as shown above.

Parts List

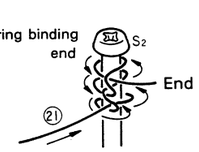
Parts No.	Stock No.	Description
1	60360530	Driving String (3m)
2	07600910	Tension Ass'y

*** How to make a knot**

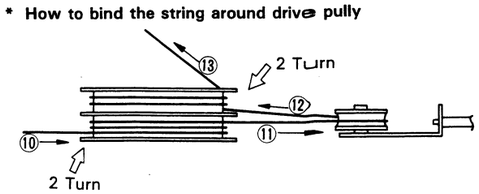
1. String binding start



2. String binding end

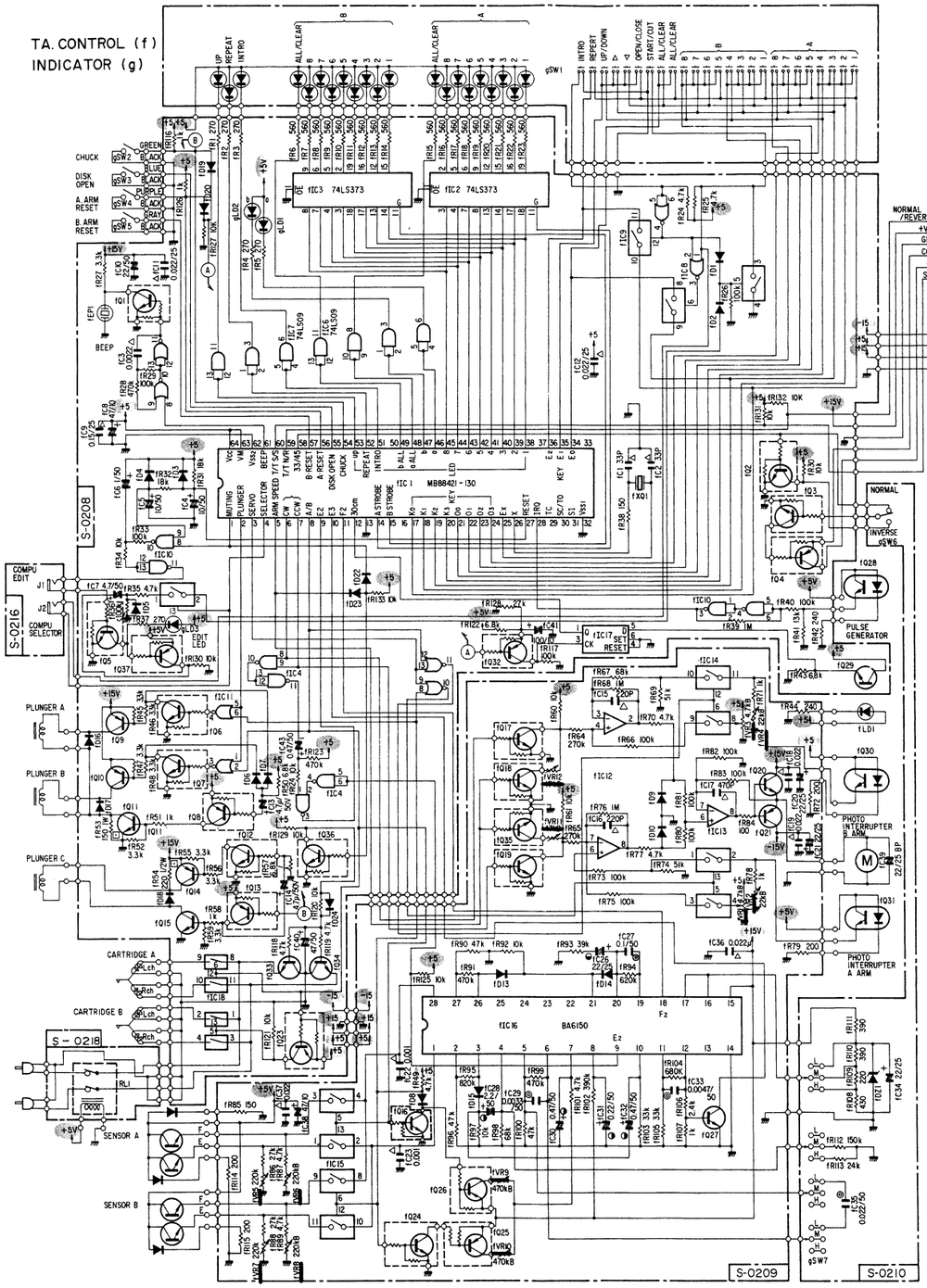


*** How to bind the string around drive pully**



11. SCHEMATIC DIAGRAM

* Design and specifications subject to change without notice for improvement.
* La présention et les spécifications sont susceptibles d'être modifiées sans préavis par suites d'améliorations éventuelles.
* Änderungen, die dem technischen Fortschritt dienen, bleiben vorbehalten.



eDZ1	05ZI2-Y
eIC1,2	HW-301C-(Q,R)
eIC3	BA6301
eQ1 ~ 4	2SA952(M,L) PAIR
eQ5 ~ 8	2SC2001(M,L) PAIR
eQ9 ~ 13	2SA1115(E,F)
	2SA1048(Y,GR)
eQ14 ~ 18	2SA1175(H,F,E)
	2SC2603(E,F)
	2SC2458(Y,GR)
eQ19 ~ 20	2SC2785(H,F,E)
	2SC2603-F
	2SC2458-GR
eQ21	2SC2785-F
	2SA1283-E
	2SA934-R
hD1,2	RB152
hDZ1,2	05ZI5-Y
hIC1	μPD7805H, NJM7805
hQ1	2SD313AL(E,F)
hQ2	2SB744(Q,P)
fD1 ~ 20, 22 ~ 24	IS2473
fIC1	MB88421-130
fIC2,3	MB74LS373P, HD74LS373
fIC4,10	MB84011BM, μPD4011BC, TC4011P
fIC6,7	MB74LS09, HD74LS09
fIC8,11	MB84001BM, MSM4001BRS, μPD4001BC
fIC9,14, 15,18	MB84066B, MSM4066RS, μPD4066BC, TC4066BP
fIC12	BA715, NJM4558S
fIC16	M5218L
fIC16	BA6150
fIC17	MB84013BM, MSM4013BRS, TC4013BP, μPD4013BC
fLD1	LD261-5
fQ1 ~ 3, 5 ~ 7, 12, 16 ~ 19, 24, 27, 35, 36	DTC124
fQ4, 8, 13, 23, 25, 26, 32, 37	DTA124
fQ9, 10, 14	2SA1283(E,D)
	2SA934(P,Q,R)
fQ11, 15	2SC3243(D,E)
	2SC2060(P,Q,R)
fQ20	2SD313AL(E,F) PAIR
fQ21	2SB507VIIAL(E,F) PAIR
fQ28	GP-IS03
fQ29	PH101
fQ30,31	CN1128
fQ33,34	2SC2878(B,A)
	2SC3327(B,A)
fDZ1	05ZI0-Y
gLD1 ~ 3	SLR-54URC5

2SA934, 2SA952, 2SA1283, 2SC2001, 2SC2060, 2SC2878, 2SC3243 — 2SB744

2SA1175, 2SC2785, 2SC3327, DTA124, DTC124 — 2SB507, 2SD313

2SA1048, 2SA1115, 2SC2458, 2SC2603 — BA715

μPD4066BC — HW301C (1:INPUT 2:OUTPUT 3:INPUT 4:OUTPUT)

M5218L — μPD7805H, NJM7805 (1:GND 2:OUTPUT 3:INPUT(V+))

μPD4001BL, μPD4011BC, μPD4013BL, BA6301, HD74LS09, HD74LS373, M74LS09, M74LS373P, MB74LS373, MB84001BM, MB84011BM, MB84013BM, MB88421-130, MSM4001BRS, MSM4011RS, MSM4013BRS, MSM4049RS, MSM4066RS, TC-4001BP, TC4011P, TC4013BP, TC4066BP — set for Slit or Line

MB84066B, MB74LS09

1S2473177

MB84049B

05ZI0-Y, 05ZI5-Y

RB152

NJM4558S

SYMBOL
△ Ceramic
Ⓜ Mylar
Ta Tantalum Electrolytic
◒ Low-Leak Electrolytic
(B.P) Bi-Polar Electrolytic
⊡ Non Inflammable Resistor

RESISTORS
Are in ohms, 1/4 Watts, ±5% Tolerance
Unless Otherwise Noted. k: kΩ, M: MΩ

CAPACITORS
Are in μF, Unless Otherwise Noted. P: pF

Each D.C Voltage measurd by the instruments discribed below shows the nominal value in volts of 33 1/3 rpm
Measuring instrument
Volt Meter
Oscilloscope

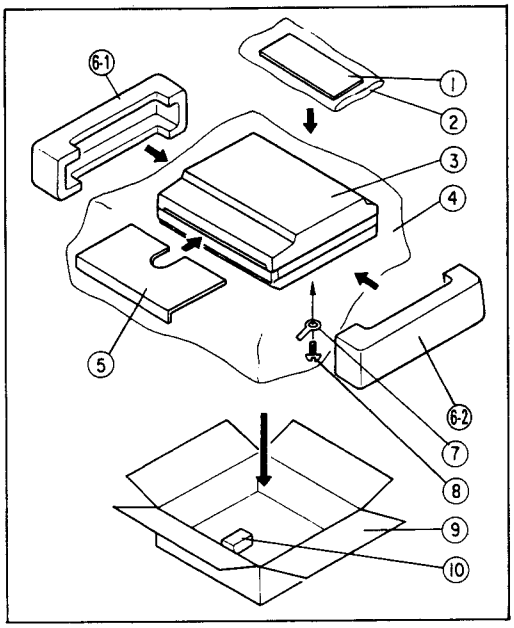
Electrolytic Capacitor : Capacitance 1μF1 / Volt 1V1

⚠ is Safety Part.
Use only replacement parts recommended by the manufacturer.

SYMBOL OF FUNCTION
(e) MO. CONTROL
(f) TONE ARM CONTROL
(g) INDICATOR
(h) POWER SUPPLY

12. PACKING LIST

Parts No.	Stock No.	Description
1	———	Accessories (Sound Absober)
2	———	Polyethlen Bag
3	———	Turntable
4	91122710	Vinyl Bag
5	13285400	Corrugated Board
6-1	13287710	Styrofoam Packing (Left side)
6-2	13287810	Styrofoam Packing (Right side)
7	———	Tag
8	00423400	Transit Screw, 4 × 16 Binding
9	13262800	Carton Case (Silver Model)
	13294700	Carton Case (Black Model)
10	———	Bottom Packing



13. ACCESSORY LIST

	Stock No.	Description
	46267300	2P Plug Cord
	46798100	Operating Instruction
	Accessories (Sound Absober)	
{	13308100	Wooden Board (Front Side)
{	13308000	Wooden Board (Rear Side)
{	13307900	Pipe
{	13145100	Insulator